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A  
M A N U A L  
OF  
GEOGRAPHICAL SCIENCE,  
*(Ancient & Transition)*

MATHEMATICAL,  
PHYSICAL, HISTORICAL,  
AND  
DESCRIPTIVE.

*by*  
*Raman & Nicolay.*



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# MANUAL OF GEOGRAPHICAL SCIENCE.

*PART THE SECOND.*

## DESCRIPTIVE GEOGRAPHY,

CONTAINING

I.

### ANCIENT GEOGRAPHY,

By THE REV. W. L. BEVAN, M.A.

VICAR OF HAY, BRECON.

II.

### MARITIME DISCOVERY

AND

## MODERN GEOGRAPHY,

By THE REV. C. G. NICOLAY, F.R.G.S.



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# DESCRIPTIVE GEOGRAPHY.

## PART I.

### ANCIENT GEOGRAPHY.

#### INTRODUCTION.

CLASSICAL Geography in its widest extent consists in the description of the world as it was known to the ancients, from the earliest recorded ages until the decline of the Roman empire. Its office is, in the first place, to give a sketch of the lands and places which were the scenes of the most interesting events of ancient history: in the second place, to trace the progress of geographical knowledge—to define the systems, whether fabulous or true, which were contemporaneous with the various eras of civilization and literature—and to follow the widening circles of discovery and scientific research as they successively opened upon the human mind. The importance of the first of these, as an auxiliary to history, is too evident to require proof: the second, the history of geography, is hardly less important to the classical student, both from the interesting nature of the subject, and as it serves to illustrate the writings of antiquity by placing him in the point of view from which the writers themselves regarded the world.

#### CHAPTER I.

##### HISTORY OF ANCIENT GEOGRAPHY.

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THE sources whence we can draw materials for a history of geography in the earliest ages are scanty and uncertain; in the absence of any definite treatise on the subject among the writers of antiquity, we have to fall back upon the scattered notices of travels by sea and land, the advance of colonization, the lines of commerce, military expeditions, and the traditional accounts of distant places, as common report described them. Certain primitive notions respecting the figure and position of the Earth seem to have been very generally held by nations in a primeval state of civilization. Before intercourse with other lands extended their knowledge, the Earth appeared to be a flat circular disc, surrounded on all sides by water, and covered with the heaven as with a canopy, in the centre of which their native



land, or more nearly still, the chief seat of divine worship was situated. Thus the Hebrew writers speak of 'the circle of the Earth,' (Isa. xl. 22; compare Prov. viii. 27,) and of Palestine as in the 'middle' or 'navel' thereof, (Ezek. xxxviii. 12; marginal translation,) and still more particularly of Jerusalem as 'set in the midst of the nations round about her,' (Ezek. v. 5.) Thus also, the early Greeks conceived the world to be a flat circle surrounded by the river Ocean, and Mount Olympus, the residence of the gods, or in later times Delphi, the seat of the most renowned oracle, as the centre. The same notion has been found to prevail among the Chinese and Hindoo geographers. It has certainly been questioned whether the Hebrew writers in the passages referred to did not merely adopt the popular belief without intending to express any definite philosophical opinion on the subject: it may have been so; but as we know for a certainty that the notion actually existed in Greece, and was not exploded for many centuries, there is no difficulty in believing that a like opinion may have prevailed even among the more enlightened Hebrews.

2 The Phœnicians were certainly the first to communicate to the natives of Greece, at that early period not a sea-faring people, any information as to distant lands. Before the age of Homer, these adventurous traffickers had navigated all parts of the Euxine and Mediterranean Seas, and had even passed beyond the Pillars of Hercules into the western ocean. But with the selfish view of retaining the commerce in their own hands, they either attempted to withhold their knowledge altogether from others, or invested distant countries with imaginary horrors, by peopling them with fabulous monsters. From them the Greeks first heard of the Ocean, of the Cimmerians, of the Cassiterides, and other places. The Phœnicians were also the first nation who extended their geographical knowledge through colonization. Besides various settlements nearer home, on the islands of Crete, Cyprus, &c., and on the southern coast of Asia Minor, they founded the distant colonies of Gades, (B.C. 1085,) and afterwards Carteia, Malaca, and Hispalis, in Spain; Utica, (about the same date as Gades,) Carthage, (B.C. 878,) and Hadrumetum, on the coast of Africa; and Pronœtus and Bithynium, on the southern shore of the Euxine.

3 The fame of their successes and of the wealth they obtained, stimulated the Greeks to undertake a commercial expedition into the Euxine Sea. Such was, in all probability, the object of their first attempt at distant navigation, the history of which forms the groundwork of the far-famed story of the Argonautic Expedition. About the year 1260 B.C., a bold band, starting in search of the golden fleece, passed the dangerous Cyanean rocks at the mouth of the Thracian Bosphorus, and penetrated to the city of Æa in Colchis, at the eastern extremity of the Euxine. The route which they followed on their return is variously stated: according to some accounts, they passed from the Euxine into the North Sea, either by the course of the Phasis or of the Tanais, and thence through the Adriatic to Greece; another account represents them as returning through the Erythræan Sea, that is, the Southern Ocean, and across Libya. To discuss the various myths connected with this expedition is foreign to our subject: it is more to the purpose to remark that the assignment of Colchis, as the scene of their exploits, is an addition of comparatively modern date. Homer does not mention, and probably was not acquainted with the name of Colchis; no traces of any town of the name of Æa existed on the Colchian coast in historical times. It appears that the scene of action was in each age removed backward to the extremity of the known world, until it reached the most easterly point of the Euxine. As the voyage to Colchis was deemed hazardous in the latest times of ancient history, it is by no means likely that the Argonauts penetrated so far: the utmost limit of the expedition would be the Tauric Chersonese, and there we must place the town of Æa, if indeed we do not rather consider that name as a mere appellation in Homeric geography for any extremely distant land.

4 The first traces of anything like a geographical system occur in the Homeric poems. Without attempting to affix any date to these compositions, we should be warranted in saying that they represent the state of geographical knowledge down to the commencement of the ninth century, B.C. Not that there is any methodical exposition of the views of the age on this subject—the nature and matter of the poems would not admit, nor lead us to expect, as much,—but the incidental notices are numerous enough to enable us to picture to ourselves the world as Homer conceived of it, and have therefore obtained for him the reputation of being the first geographer. In considering the details of the Homeric geography, we must attempt to separate the mythical from the true: the former will throw light upon the allusions in the poems; the latter will enable us to ascertain the progress of discovery in that age.

Homer, like many of his successors, was totally ignorant of the *spherical* form of the world: he conceived it to be a flat circular body, the upper face of which was the habitation of *men*, while the lower was the region of Tartarus, the abode of the punished *gods*. Over the earth stretched the vault of heaven, and round it flowed incessantly the stream of Ocean. The heaven rested in its extremities on the surface of the earth; but more especially was it supported in the west by the Pillars of Atlas. Whether we are to understand under that name the mountains in the west of Africa, is a matter of doubt: it is possible that a rumour of that lofty range reached Greece through the Phœnicians: but the terms applied to it lead us to think of Atlas as a *god* rather than as a mountain, and in this sense it may be a personification of the power which upheld the heaven at the horizon, whose abiding-place would naturally be transferred from spot to spot, as discovery advanced westward, until it rested in the last great chain of mountains which appeared to bound the world in that direction. The Ocean which surrounded the earth, like the rim of a shield, is always spoken of as a *river* or *stream*, differing in character from all other bodies of water, and yet the parent of them. If we ask whence the Greeks, who had not themselves passed the Pillars of Hercules, derived their knowledge of the Ocean, two explanations may be proposed. Either they received information of its existence from the Phœnicians, or else they were led by instinct to suppose that as the lands with which they were acquainted were islands surrounded by water, so the whole world was one large island terminated by a similar boundary. For the first of these suppositions, it has been alleged that the word 'Oceanus' is of Phœnician extraction, *ogh* signifying in their language an 'encircling stream': for the latter, it might be urged that a similar belief has obtained among most rude tribes in other parts of the world where no such channel of information was open to them. Distinct from the Ocean was 'the Sea'—*πέλαγος* or *πόντος*—by which the Mediterranean is designated, which communicated with the Ocean at its western extremity, and which formed the receptacle for the various minor rivers of the world, whose springs, however, were all connected with the Ocean-stream by subterraneous passages—an idea possibly founded upon the not unfrequent phenomenon in Greece of rivers disappearing for some distance in the earth, and re-issuing, another and yet the same. Out of the Ocean, or, more correctly, on the other side of its stream, the sun arose at morn, and into it he sank at eve; and the two points where he appeared to touch the water formed the cardinal points in Homeric geography. The world was divided into two portions: the side towards the *rising*, and the side towards the *setting* sun—the region of day, and the region of night. Where the sun rose, there (perhaps in reference to some report of the Caspian Sea) was placed the Lake of the Sun: on its shores dwelt the Æthiopians—i. e. the *burnt-faced*, probably placed there under the idea that the sun, in rising, came into close proximity with the earth; or, as others have supposed, from a rumour of the singularly dark complexion of the Colchians. Here, too, lay *Æa*, the most distant of lands. Corresponding with this distribution of localities on the morning side of the world, we find on the evening side, near the spot where the sun sank, another race of Æthiopians, and a second

isle of *Æa*. Here were situated the gates of the Sun, and the rock *Leucas*—i. e., *glittering*, significant of the brightness of the setting orb. In this quarter also, imagination suggested that the regions of death and darkness, and the abode of departed spirits, would be found: As the rising sun is to all persons an image of life and vigour, so is the setting sun of death and decay. All nations have concurred in fixing the locality where departed spirits rest after death towards the west. In the Homeric system, therefore, Hades is supposed to lie *across* the Ocean-stream—i. e. on the opposite bank to the world, behind the spot where the sun sets—a dark, gloomy region—a fit place for the punishment of the wicked, where the fabled *Cimmerians*\* dragged out their existence in perpetual mists. Along with this notion of Hades, we meet with another in Homer, which seems to have been more generally entertained, that Hades was not on the face of the earth, but *in* the earth. Numerous expressions apply to this subterranean Hades, whence some have been led to think that this was the real abode of the dead, and that the other across the Ocean-stream was merely the *entrance* from the upper world to the lower. However, it is clear that the two notions of a Hades *above* and a Hades *in* the earth were contemporaneous, and are equally expressed in the Homeric poems. Nor is it difficult to account for the existence of this idea of a subterraneous Hades: all material bodies in a state of dissolution return to the earth, and are mixed with its substance: the bodies of men are deposited below its surface; and all the lines of decay point downwards: so that it is no wonder that from an instinctive feeling the abode of departed spirits was placed in the bowels of the earth. It must be further observed, that the position of Hades is *in* the earth, while Tartarus is *under* the earth, on the lower face of the world's disc. This was regarded as being to the gods what Hades was to men. It was also covered with a vault, the counterpart of the heaven on the upper surface. One important locality in mythical geography remains yet to be noticed: since both the above conceptions of Hades involved the idea of gloom and misery, it was necessary to assign a place of happiness for the souls of the just: Elysium was their abode—still in the west, for that was the region of death in every form, but on *this side* of the Ocean-stream, and thus enlightened and warmed by the rays of the setting sun. This, like all other mythical localities, was moved further westward as discovery advanced: in the time of Homer, as the Mediterranean Sea had not been explored much beyond Sicily, it would be situated somewhat to the west of that island.

If we turn from the general view of Homer's geographical system to consider the various localities described by him, we find that the land of Hellas was deemed the centre of the world's circle. The continents are not distinguished as such, nor are they designated by any general names: for Asia applies only to the pasture land in the upper valley of the *Cayster*: and Europe, which first appears in one of the Hymns ascribed to Homer, seems to be confined to Greece north of Peloponnesus, while Libya signifies a part of the African coast west of Egypt. Asia was the quarter with which Homer was best acquainted: we have mention of the *Halizones* and *Amazones* in the district afterwards called *Pontus*,—the *Paphlagonians* and *Heneti* in *Paphlagonia*—the *Caucones* in *Bithynia*—the *Phrygians*—the *Lycians* with the promontory *Chimæra* in the south coast of Asia Minor—the *Solymi* in *Cilicia*—the *Brembi* in the eastern coast of the Mediterranean, north of *Phœnicia*—the *Arinnæi* (in whose name we recognise the *Aram* of Scripture)

\* Two derivations are proposed for this name. The Greek word, *χειμέριος*, 'wintry,' and a Shemitic word, *kumar*, 'darkness.' According to the latter, the Greeks would have heard of the *Cimmerians* from the *Phœnicians*: either notion is equally adapted to the position assigned to this people both in Homeric and later systems of geography; for the land behind the sun would be deemed a land of winter and storm as well as of darkness: just as afterwards when experience proved that no such land existed towards the west, the abode of the *Cimmerians* was transferred to the north.

in Syria—and in the west coast of Asia Minor, Mæonia, later Lydia—the Cilicians in Mysia—and the Dardani about the Propontis.

In Africa, we read of the land and river of Egypt (the name of Nile does not yet occur) with the ancient Thebæ, and the isle of Pharos, a day's sail from the mouth of the river—Lybia to the westward—then the Lotophagi, who doubtless dwelt about the modern Tunis and Tripoli, where the Lotus, or jugube, is still an article of food—the Æthiopians in the west, and in the south, the fabulous Pygmæi. Some have concluded that Homer was acquainted with the Lake Triton, but the epithet, 'Triton-born,' applied to Juno, refers, without doubt, to the Bœotian stream.

In Europe we meet with many descriptive and topographical notices of the midland provinces of Greece and the Peloponnesus, with which the writer appears to have been personally acquainted; but beyond this his knowledge was uncertain. The Leucadian rocks set a limit to the coasting navigation of that day, so that even Coreyra, which is indubitably the Scheria of Homer, was rarely visited, while northwards of that island the unexplored Adriatic was supposed to extend as far as the limits of the world, enclosing the island Ogygia, 'the navel of the sea,' far up to the north-west. To the west, discovery had made known the existence of Sicily and the Æolian isles, and probably of the lower districts of the Italian peninsula: but even here there was much uncertainty: Sicily is not mentioned by name (for Trinacria, which from its etymology would suit it, is described in terms that cannot apply to Sicily): it appears as the residence of the Cyclopes, the Læstrygones, and the Sicæni, occupying respectively the southern, northern, and eastern coasts of that island. The Æolian islands correspond with the Homeric Planctæ (i. e. the *wanderers*), a title elsewhere attributed to *groups* of islands which appear to a sailor to change their relative positions and wander about; Trinacria may be one of these islands; it lay, at all events, to the north of Sicily, and in the neighbourhood of Scylla and Charybdis; and lastly, the isle of Ægusa, to the west of the Prom. Lilybæum, is described as an island abounding with goats. On the continent north of Midland Greece, mention is made of Dodona, the residence of the Selli in Epirus; of Pieria, later Thessaly; Emathia, later Macedonia; of the Cicones and Mysians in Thrace, the former near the Propontis, the latter on the shore of the Euxine, south of the Danube; and of the Hippomolgi, a Scythian tribe, still more to the north.

5 Colonization was in the meantime paving the way for more extended views. In the twelfth century before Christ three successive migrations had issued from Greece to Asia Minor, and occupied the eastern coast; and these, favoured by their maritime position, and encouraged by the success of their commerce, planted subordinate colonies in distant countries both to the east and west, and thus opened new scenes and fresh lines of commerce. The larger islands of the Mediterranean were at this early period centres of commerce. The Æginetans were deemed the original navigators of the Ægean Sea; the Cretans, inhabiting the Cyclades, were also famed for their bold adventures; Rhodes had gained its highest prosperity about 900 B.C., and had planted colonies in Iberia and on the coasts of Italy; the town of Chalcis, in Eubœa, founded Cumæ 1030 B.C., and even before this, Metapontum had been built by the inhabitants of Pylos, and the Phocæans had established a vigorous trade with the southern coast of Gaul and the western islands of the Mediterranean.

6 We shall not be surprised, then, to find that in the age of Hesiod (800 B.C.) the knowledge of geography had considerably extended, particularly towards the west. He mentions, for instance, the Tyrrheni, and their king Latinus, in Italy: in Sicily, Ætna and the town Ortygia, later Syracuse: in the south of Gaul, the Lygians: and in Spain, the garden of the Hesperides, in reference to the citrons and oranges of that country. In the far west lay the islands of the blessed, and in place of Homer's Elysium the island Erytheia at the spot where the sun sank to his rest: beyond the Ocean-stream, and on the surface of the Earth, was the abode of the dead, Hades.

The story of the Cimmerians in the west seems to have been exploded, and the scene of fable is translated to the north where dwelt the happy Hyperboreans, where also he had heard of the amber-yielding Eridanus, probably the *Radawne*, a tributary of the Vistula. The Ister was known to him, and the Phasis, to the east of the Euxine, and the nomad races in those quarters: the Hippomolgi of Homer received their proper appellation of Scythians: the Nile also is mentioned under its proper name, and the south of Africa became the recognised abode of the Æthiopians, whom Homer had placed in the east and the west.

7 The cyclic poets who form the link between the Homeric and the tragic periods of Grecian literature, record little or nothing of the advance of geographical knowledge. Nevertheless, there must have been a great accession to their store of knowledge during this period, through the progress of colonization. In the west, numerous flourishing settlements were planted in Sicily and Grecia Magna:—Syracuse, B.C. 735; Naxos, 733; Sybaris, 720; Croton, 710; Tarentum, 707; Rhegium, 668; Selinus, 630; and many others. About the year 700, B.C., the Samians, under Colaus, penetrated the Straits of Gibraltar and reached Tartessus, which had never before been visited by any Greek. The Phocæans seem to have been the first to establish any regular commerce with it: they are said to have settled there about 630 B.C. Towards the south, Libya was now, for the first time, opened by the foundation of Cyrene, B.C. 631 by Theræans, and still more by the wise and enlightened policy of Amasis, king of Egypt, who allowed the Greeks to settle at Naucratis, B.C. 540, and to carry on an active trade with his hitherto exclusive subjects. At the very same period, the vessels of Miletus were roving freely over the Euxine, with which they became so familiar, that they changed its name from Axenus, the *inhospitable*, to Euxinus, the *hospitable*. On its coasts they planted the flourishing colonies of Sinope in Paphlagonia, Amisus in Pontus, Phasis and Dioscurias in Colchis, with several others of lesser fame; and from these depôts they carried on an extensive commerce with the interior in grain, wood, fish, metals, &c.

8 The close of the seventh century witnessed the first essay at maritime discovery in the well-known attempt of the Phœnicians to circumnavigate Libya. Under the patronage of Necho, king of Egypt, as Herodotus relates, a Phœnician expedition entered through the Red Sea into the Southern Ocean, and in the third year returned by the Columns of Hercules to Egypt. Herodotus does not tell us whether he believed or disbelieved the general narrative: he only throws discredit upon the report which the Phœnicians brought back, that in sailing round Lybia they had the sun on their right hand. Whether these Phœnicians did really double the Cape of Good Hope and return to Egypt through the Straits of Gibraltar, has been a *veraxa questio* among geographers. Rennel has supported the credibility of the story with strong arguments; but the particular circumstance on which he and others, who have taken the same view of the story, lay so much stress, that the sun appeared to the sailors to be on their right hand, would not necessarily prove that they sailed round Africa, but would only show that they advanced some distance south of the equator. Without going into the arguments urged on either side, it is important to remember that no mention is made of this voyage by later geographers, as Strabo, Pomponius Mela, or Pliny: and that the circumnavigation of Africa always remained a problem to the ancients much in the same way that the north-west passage has been to navigators in modern times.

9 The sixth century is remarkable for the introduction of scientific geography. The founder of the first school of philosophy among the Greeks, Thales, a native of Miletus, flourished between the years 640 and 548 B.C. The extensive commerce of the Ionian cities had served to explode the mythical account of the world's form and extent, and to open the way for more enlightened, though hardly more correct, theories. Thales taught that the heaven was a hollow ball, in the midst of which the Earth, in

form like a tambourine (i. e., circular, solid, and with two surfaces, an upper and a lower), floated just as a cork floats on water. His pupil and successor, Anaximander, also of Miletus, (611—547 B.C.) held nearly the same opinion; he compared the world to a cylinder, on the upper surface of which our abode was fixed. He is also reputed to have been the first man to draw a map of the world. Neither he nor his successor, Anaximenes, nor indeed any of the Ionian school, had the slightest suspicion of the *spherical* form of the earth: the merit of this discovery is due to the Pythagoreans, who came to that conclusion from astronomical observations. Whether Pythagoras himself was aware of the truth, is uncertain: probably the discovery was made considerably after his time, as we do not find it received generally in Greece until the age of Plato.

10 While philosophers were thus busied with speculations as to the physical conformation of the Earth, another class of writers, the Logographers, conferred most signally to the advance of Practical Geography by the descriptions they gave of various quarters of the globe. Their writings have unfortunately perished, with the exception of a few fragments: but the mere titles of the works serve to illustrate the progress of geographical knowledge in the age before Herodotus, and also enable us to estimate the value of that eminent historian's researches. Not to mention the less important writers, Dionysius of Miletus, about 510 B.C., is said to have written a description of the world, as well as a full account of Persia and a narrative of the Argonautic expedition. Hecataeus, the most famous of the school (549—486 B.C.), also wrote a description of the world, divided into various sections for each particular country. He adhered to the old notion that the world was a circular disc surrounded by the ocean: so at least we have reason to conclude from Herod. 4. 36, who is supposed to refer to the opinions of Hecataeus. He divided the world into two continents—a northern and a southern—separated in the west by the Straits of Hercules, and in the east by the Caucasus and Araxes, or as some suppose, by the Tanais; and he thought the northern half, Europe, equal in extent to Asia and Libya together in the south. He was intimately acquainted with the lands frequented by the Greeks, and he gives notices of numerous seaport towns, not mentioned by other writers. His account of the west of Europe is much more full than the scanty notices in Herodotus would have led us to expect. It did not indeed fall in with the general aim of the latter historian to describe Gaul or Spain; and to this, rather than to ignorance, we must assign his comparative silence as to the west. Hellanicus of Mitylene (496—411 B.C.) wrote an account of various lands—Troas, Persia, Egypt, and Greece. Many names, nowhere else mentioned, occur in his writings; and he is believed to have been the first Greek writer who mentioned Rome. Lastly, Pherecydes of Leros, about 500 B.C., remains to be mentioned: he, like Hecataeus, considered the world a circular disc, divided into two continents—the northern and the southern. He mentions the Eridanus, Tartessus, the lake Triton, and other distant places; but the fragments of his works are so scanty, that they add nothing to the information to be derived from his predecessors.

11 To the Logographers we must add another class of men, whose works were directed exclusively to geography, those, namely, who wrote accounts of their own travels. In the year 509 B.C., Scylax of Caryanda, undertook an expedition, at the command of Darius, to explore the mouths of the Indus; starting from Caspatyrus, in Pactyice—supposed to be *Cashmir*—he descended the Indus and coasted along the Indian Ocean to the Red Sea and Egypt. His account of his travels is lost, the *Periplus* of Scylax, which now exists, being a compilation of a much later date. Another expedition was sent out by the orders of the same monarch, under Sataspes, a nobleman who had incurred his displeasure, and who was sentenced to sail round Africa as a commutation for capital punishment. He passed through the Straits of Gibraltar, and steered to the south, doubling Prom. Solæis, *C. Cantin*, but

being detained by baffling winds—about *Sierra Leone* in all probability—he returned to Persia after some months. A more noted expedition in the same direction was conducted by a Carthaginian, Hanno, about 500 B.C. All the circumstances connected with it have been made a matter of discussion, even to the date of its occurrence, which some have placed as early as 1100, and others as late as 317 B.C. The chief cause of the difficulties lies in the brevity of the narrative which has come down to us. The original document appears to have been an inscription in the Punic tongue, suspended in a temple at Carthage, and thence copied by a Greek merchant, who translated it into his own tongue; this translation, itself possibly incorrect, is our only source of information. The object of the expedition was to found colonies on the coast of Libya, as well as to explore the coast itself; Hanno succeeded in the first object so far as to lay the foundations of six—one, Thymiatium, on the northern side of Prom. Solæis, *C. Cantin*, and five on the other side, between it and the river Lixus. Thence, sailing southward, he fell in with an island, Cerne,—a river, Chretes,—two great bays, called the Western Horn and the Southern Horn, and a hill, which he called Theon Ochema, i.e., the chariot of the gods. Without going into the details of the narrative, and of the views founded on it, it will suffice here to state that three widely different opinions have been expressed, each with some grounds of probability. Gosselin terminates the voyage at *C. Nun*, opposite the Canaries; Bougainville supposes it to have extended into the *Bight of Benin*; while Rennell, with greater probability, limits it to the neighbourhood of *Sierra Leone*, identifying Cerne with the island *Arguin*, the great bay with that containing the *Bisago Islands*, and the South Horn with *Sherbro Island*. Whichever hypothesis we adopt, it is certain that the voyage of Hanno did not contribute to rectify the erroneous notions as to the shape of Africa, which prevailed to a very late period. Contemporary with this expedition of Hanno, was another no less interesting to ourselves, undertaken by the same enterprising people. We refer to the voyage of Himilco, whose narrative is to a certain extent preserved to us in the works of Avienus. He discovered the British isles, Albion and Ierne, and mentions the *Cestrymnides*, *Scilly Islands*, which he calculated a four months' voyage from the coast of Tartessus.

12 We have thus traced the progress of geographical knowledge from its infancy to the time of Herodotus. His writings form an era in geography, as being the commencement of a more real and enlightened system, the materials of which were drawn from actual observation and scientific research. Before proceeding to a consideration of his system, it will serve to elucidate the opinions of the age in which he lived, if we collect the scattered notices to be found in the poems of Æschylus. Omitting any attempt to reconcile the account of the wanderings of Io with true geography (for the most careful and ingenious explanations are unsatisfactory, and only serve to show the impossibility of coming to any conclusion), we shall confine our attention to the general notions which he held, and to such specific remarks as betoken the extending sphere of geographical knowledge among the Greeks.

He represents the world as a circular body, with Delphi in the centre, surrounded by the ocean, which he rightly deemed a sea, and not a river. In place of the *two sides* of the world, we hear of the *four quarters*, north, south, east, and west. We further find that he adopted the division of the world into *three continents*: the Phasis separating Asia, and the Straits of Hercules Libya, from Europe. He retained the Homeric position of the Æthiopians, one branch of whom lived in the east, the other in the west, where the sun sank into a lake. The knowledge of the east had evidently been much increased by the unfriendly intercourse with the Persians, for we first hear of the land of Cissia, of Babylon, Ecbatana, Bactria, Syria, and Tyre. In Africa the cataracts of the Nile, the city of Memphis, and the lake Triton, are mentioned. In Europe, the Rhipæan mountains containing the sources of the Ister, the Mæotic Sea, and the Cimmerian Bosphorus, were the

limits of his knowledge towards the north-east; while towards the west he mentions the Tyrrheni, Rhegium, Ætna, the Ligyes in Gaul, and probably the Adriatic Sea, under the name of the Gulf of Rhea. It need not surprise us to find that the mythical element still retained its place in the poetical works of the day, which would after all be an indication more of the popular belief than of the opinions of the learned.

13 Herodotus, of Halicarnassus (who was born 484 B.C., and died about the end of the Peloponnesian war), has always been considered the father of ancient geography. As the object of his work was directed to a narrative of the disputes between the Greeks and Persians, we should not anticipate any systematic or general delineation of the world and its subdivisions. Nevertheless, the incidental notices of what he had himself seen and heard in the course of his travels in Asia Minor, Phœnicia, Palestine, Syria, Mesopotamia, Assyria, Media, Egypt, and the north coast of Africa, Sicily, and Magna Græcia, embrace a description of almost all the lands known to the Greeks of that day. Towards the west of Europe, indeed, his knowledge was very limited, as we have already had occasion to notice; towards the north-east he had himself penetrated to Colchis and the Phasis; he knew as much or more about the Caspian Sea, than his successors to the time of Alexander; he had navigated the Euxine, and had visited the Borysthènes; and southwards he had gone as far as Elephantine.

Herodotus can hardly be said to have formed any distinct notion as to the Earth's form and size: while his knowledge was sufficient to disprove the correctness of the mythical system, it was insufficient to lead him to replace it by any more certain theory. Thus, he ridiculed the idea which had hitherto prevailed, that the world was *circular*: he did not feel sure that it was surrounded on all sides by water; and as for the Homeric opinion of the Ocean-stream, he set it down as a mere poetical fiction: the division into the three continents, Europe, Asia, and Libya, which appears to have been pretty generally received, he also rejected as false and unreasonable. According to him, the world would be rather of an *oval* shape, having its extension east and west, surrounded in all probability by water, not divided into separate continents, but rather to be regarded as one vast island. He was inclined to adopt a twofold division of the Earth's surface: to the northern half, Europe, he assigned all that we call Northern Asia; to the southern half Asia with Africa, which he deemed a peninsula of Asia: the boundary between the two continents ran from west to east, through the Straits of Gibraltar, the Mediterranean, the Euxine, along the course of the river Phasis, and was thence carried onward to the unlimited east by the river Araxes, under which title Herodotus describes not only the Armenian river of that name, but also the Iaxartes, *Sirr*, which now flows into the *Sea of Aral*. Europe was thus equal to, or, as some interpret the words of Herodotus, greater in breadth than Asia and Africa together; but inferior in depth. The world was bounded on the south by the Red Sea, a name evidently intended to apply to the whole of the Indian Ocean; and on the west by the Atlantic: its boundaries to the north and east were unknown.

The following brief sketch of each continent, as known to Herodotus, will serve to show the extent of his knowledge. In the west of Europe, he mentions Spain under the name of Iberia, with the towns, Tartessus, Gadeira, Cadix, and the neighbouring isle, Erytheia, *Trocaulero*: to the westward—for he appears to have given Europe a much greater extension beyond the Pillars of Hercules than it actually possesses—the Keltæ, with the town Pyrene, where the Ister had its rise, evidently a mistaken allusion to the *Pyrenees*: beyond the Keltæ, the Cynetes or Cynesii, whose locality cannot be settled. He had heard of the Cassiterides, and of the river Eridanus, whence amber was procured, about the shores of the Baltic, but he knew nothing further of them. In later Gaul, he mentions Massilia, *Marseilles*, the Ligyes, and the Elisyci. The island *Sardinia*, the size of which was much exaggerated in the east, appears by the name *Sardo*, and *Corsica*, with



the Phœcean colony, Alalia, by the name Cyrrhus: Sicily, with its towns, was known intimately to him. The name Italia occurs for the first time in his writings, applied, however, only to the lower coast of the peninsula, or what was afterwards called Magna Græcia; while the remainder of the peninsula is noticed as the residence of the Ombrici, in whose name we recognise the Umbri, and in parts, as Enotria and Tyrsenia. Rome he does not mention, though it was probably known to the Greeks of his day. In Illyria he mentions incidentally the Heneti, on the Adriatic,\* the Enchelei, and the river Angrus. The course of the Ister, which he deemed the greatest of all rivers, is described at length, with its tributaries. These are, on the right bank, the Alps and the Carpiis, in reference to the Alps and Carpathian mountains,—the former possibly representing the *Inn*; the Brongus, *Save*, with its tributary, the Angrus, *Drin*; the Scius, from Rhodope, *Isker*; a little lower down the Artanes, *Mid*; then the Noes, *Kara Lom*; the Athrys, *Jantra*, and others which cannot be identified with any certainty. On the left bank, the Maris, *Marosch*, and five other large tributaries—the Porata, *Pruth*, Tiarantus, *Aluta*, Ararus, *Sereth*, Naparis, *Jalomnitzza*, and Ordessus, *Argish*. The lower course of the Ister, Herodotus supposed to run in a direction, not from west to east, but from north to south; and thus he deemed the Ister to correspond completely with the Nile; for as the latter river ran, in his opinion, from west to east, and then turned at right angles, and flowed northwards to the Mediterranean, so the Ister, which preserved in its first course an easterly direction, turned southwards when it approached the sea, and flowed at right angles to its former course. This mistaken view of the course of the river will serve to explain the description of Scythia: Herodotus says that it was a quadrangle, bounded on two sides by the sea—viz., by the Euxine on the south, and by the Palus Mæotis on the east, (to which, it must be observed, he gave a most extravagant length upwards, describing it as little less than the Euxine itself,) and on the west by the Ister. The Ister and the Palus Mæotis were thus parallel to each other, the river forming the boundary between Thrace on the west, and Scythia on the east bank: in which case he might with consistency speak of the country beyond the Ister, north of Thrace, as being desert, in reference to the district on the opposite bank of the river, in its easterly course. In reality, Scythia lay beyond the Ister, and north of Thrace; but from his mistaken view of the course of the river, he conceived Scythia to lie to the east of Thrace. The same error has influenced his description of the other rivers of Scythia, to which he also gives a course from north to south, instead of from north-west to south-east. The rivers which he thus mentions are the Tyres, *Dniester*,—the ancient and modern names being said to be appellatives for ‘water;’ the Hypanis, *Bog*, which he correctly states to approach very near the Dniester in its upper course; the Borysthenes, *Dnieper*, with a port at its mouth, where *Cherson* now stands; the Panticapes, by some supposed to be a tributary of the Borysthenes, by others one of the coast streams which join the Euxine near that river; the Hypacyris, which empties itself near the town Carcine; the Gerrhus, also a branch of the Borysthenes; and the Tanais, *Don*. Though of these streams three, the Panticapes, the Hypacyris, and the Gerrhus, cannot be now identified, it does not follow that they did not exist when Herodotus visited those regions: the well-established instances of changes in the courses of the rivers to the east of the Caspian, would allow us to conclude that very great changes may also have occurred in the lapse of ages on the northern coast of the Euxine.

The continent of Asia was better known to Herodotus than Europe: its boundaries have already been described; while the general opinion declared the Tanais to separate it from Europe, Herodotus preferred the Phasis, which

\* Herodotus probably gave to the Adriatic considerably too great an extension northwards, as some of his contemporaries certainly did: on this supposition alone can we understand him when he says that the Sigynæ north of the Ister, lived next to the Heneti on the Adriatic.

led to the great extension eastward which he assigned to it. In describing the relative positions of the countries of Asia, he not improperly takes his stand on the high ground between the Euxine and the South Sea, regarding this as the centre of the western Asiatic system. Here dwelt, contiguous to each other from north to south, the Colchians, the Sasprians, the Medes, and the Persians. He then proceeds to say, that from this region two *actès* strike out, towards the west and towards the south. By an *actè* he means, not strictly a peninsula, but a projecting region washed on most of its sides by water, and connected with the continent by a base, either extensive or confined, as the case might be. The western *actè* corresponds with Asia Minor, the southern with the great Arabian peninsula, including Assyria and Mesopotamia near its base. Of the remainder of the continent, Herodotus knew but little: it was bounded to the east by the Red Sea, into which the Indus ran, with a course from west to east: as far as India, he says, the country is inhabited, beyond it is a sandy desert. The Caspian he supposed to have its extension east and west, instead of north and south; and the river Araxes, rising to the west of that sea, flowed onward to the east of it, discharging a portion of its waters into the sea in passing, and finally being absorbed in a number of marshes. Almost the whole of Asia was subject to the Persian power in the age of Herodotus; he therefore describes it according to the division established by Darius Hystaspes into twenty satrapies, and takes occasion to mention incidentally the few nations, such as the Colchians and southern Arabians, who were not subjected: on this portion of his geography it is unnecessary now to dwell, as the details will subsequently come under consideration.

Libya, or Africa, was not deemed by Herodotus a separate continent from Asia, for the simple reason that it was connected with it by the isthmus of Suez. He speaks of it as a portion of the great southern *actè*, or rather as a continuation and excrescence of it. He nevertheless speaks of it as a separate *district*, and evidently did not consider it as below Europe or Asia in importance. It is necessary to remark that the name Libya is used by Herodotus in a twofold sense—sometimes as a collective name for the *continent*, sometimes as describing the coast district to the west of Egypt. Thus he says in iv. 42, that Libya is surrounded by water in all parts except where it touched Asia: here he must refer to the continent, Egypt included: in iv. 41, however, he represents Egypt as contiguous to Libya, and in another passage, iv. 197, he distinguishes between the Libyans and Ethiopians. That he included Egypt in Libya as a *continent*, is evident from his observations in ii. 16, 17. He divided the continent into three districts, Egypt, Libya, and Ethiopia. It is unnecessary to make any remarks on his description of Egypt, as it agrees with the later accounts of that land, with the exception that he does not recognise the threefold division generally adopted by the Roman geographers, but speaks only of the Delta and Upper Egypt. The Nile had been explored by him as far as Elephantine, and he had heard of the separation of its stream further to the south; from which point he believed the main stream to flow from west to east, perhaps in reference to some report of the great inland river of Africa—the Niger. Libya was the name of the whole of northern Africa, from Egypt eastward, to the Atlantic and Prom. Solæis, *C. Cantin*, westward: Herodotus describes this as consisting of three belts or parallel districts, widely differing from each other—1. The coast; 2. The wild district infested by wild beasts; and 3. The sandy desert. The following tribes occupied the coast:—the Adyrmachidæ in Marmarica as far as the Catabathmus—the Giligammæ to the westward, until the isle Aphrodisia, *Derna*: then the Asbystæ, separated from the sea-coast by the Cyrenians. Herodotus knew only one Syrtis, probably the Syrtis Major, on the coast of which the Auschisæ dwelt: the Nasamones followed, a powerful tribe, to the south of the great Syrtis, who went annually to Augila, *Aujilah*, to gather dates: then the Psylli: and between the greater and the less Syrtis the Macæ and the Lotophagi; the Machlyes on the east, and the Ausenses on

the west of the river Triton; the Zaucees to the south of Carthage; then the Gyzzantes to the sea, with the island Cyraunis, identified by Niebuhr with the Cerne of Hanno, *Arguin*. It appears that Herodotus materially contracted the distance between the lesser Syrtis and the Pillars of Hercules. It would also appear that he was ignorant of the extensive bend that the sea takes to the north of the lesser Syrtis, though this may be explained on the supposition that he follows in his description of the coast tribes, the parallel of latitude in which he had started; for the tribes Zaucees and Gyzzantes lived to the south of the Atlas range, while Carthage and its important territory to the north-west of the lower Syrtis is passed over in silence. In the interior, Herodotus mentions only one Oasis by name, which lay, according to his account, in the latitude of Thebes—viz., the great Oasis, or *El Khargeh*. His description of the other localities is confused, from his having placed the Oases in the same parallel of latitude. Thus, speaking of the kingdom of the Ammonians, now the *Wady Suah*, with the temple of Jupiter Ammon, he says that it is ten days' journey west of Thebes, which places it four degrees of latitude south of its real position; at a similar interval of ten days' journey came Augila, still called the Oasis of *Aujilah*, to the south of Barca; and again, at a similar interval, the Garamantes in *Fezzan*, south of the Lotophagi and the modern *Tripoli*; next came the Atarantes, supposed to be *Tegerry*, the most southerly point of *Fezzan*; and lastly, an Oasis in the vicinity of Mount Atlas, which cannot be identified with any degree of certainty. Of course the regularity of the intervals between the several Oases is imaginary, and introduced to give precision and uniformity to the narration. The notices of the third great nation of Africa, the Æthiopians or Negroes, are very few. He mentions the Troglodyte Æthiopians to the south of the Garamantes, where modern travellers have found tribes living in catacombs. He also speaks of the Macrobian, who lived by the southern sea in *Abyssinia*; the Automoli, mentioned ii. 30, lived between the Macrobian and Egypt, considerably to the south, or according to the course that Herodotus conceived the Nile to take, to the west of Meroc. He seems to have extended the course of this river westward, as far as the region of the Atlantes; the position of the Negro tribe, whom the Nasamonians discovered by the side of a river abounding with crocodiles, cannot be fixed with any certainty: it has been supposed that the river was the *Niger*, and the town they arrived at, *Timbuctoo*, or some neighbouring place.

14 Herodotus was succeeded by a writer who delighted far more in the extraordinary, Ctesias of Cnidos, physician to the Persian king Mnemon (about B.C. 400). His works on geography, of which fragments only have come down to us, relate to Persia, India, and other countries of Central Asia. He notices places and people previously unknown, or at all events, unmentioned; as the Derbicæ in Margiana; the Carmanii; the Barcanii, neighbouring upon the Hyrcani; the Hypparchus, and the Hypobarus, rivers of India; the Lake Side in the same country. It does not appear that Ctesias was considered an authority among the ancients: he is accused of ignorance and mendacity; modern scholars have judged less harshly of him, regarding his extravagancies merely as the colouring usually found in Oriental writers.

15 The Peloponnesian war brought the Greeks into contact with many tribes in the north and the west, with whom they were hitherto unacquainted, and particularly improved their knowledge of Sicily and the west. The writings of Thucydides, the historian of this war, abound with topographical and descriptive notices of spots in Greece, and other scenes of operation; but as they do not take us beyond the limits of earlier writers, they do not contribute many materials to historical geography.

His countryman, Xenophon (B.C. 445—355), in his interesting account of the retreat of the 10,000, gave accurate descriptions of various countries, with which the Greeks were but partially acquainted. The route the army took through Armenia betokens the ignorance of the day on geographical points; for they struck off too much to the north-east, thinking probably that the

Euxine extended very far to the eastward. It will be sufficient to give a general sketch of their course, in order to show the range of geographical notices in the Anabasis. They started from Ephesus, went northwards to Sardis, and crossed thence to the vale of the Mæander, by Colossæ in Phrygia; their course was circuitous in that province; after going eastwards to Celenæ, they returned to the north-west, and reached the confines of Mysia at Keramon-agera; thence, bending southwards, they followed the ordinary route to Syria by Laodicea Combusta, Iconium, and the Ciliciæ Portæ of the Taurus; they rounded the eastern point of the Mediterranean by the Amanian Gates and Issus,—and thence struck across the plain of Syria from Myriandrus to the Euphrates, crossing midway the river Chalus, *Koweik* or river of *Aleppo*. Thapsacus was the point where they came upon and crossed the Euphrates, and thenceforward they followed the left branch of the river for the whole length of the plain of Mesopotamia; the fertile field of Cunaxa, which proved fatal to their leader Cyrus, was the farthest point to the south. Instead of returning by the same route, they followed the course of the Tigris, which they crossed at Sitace, marching along its left bank up to the point where in its upper course it bends round to the west. Here they struck off to the north, through the high ground of Armenia, crossing the Centrites *Buktanchai*, the Teleboas *Kara Su*, a small tributary of the Euphrates, and the Euphrates itself, that is, the *Murad Su* or southern branch, near its source. From the Euphrates they went westward for awhile to Khanus, *Kalehsi*; and then they fell into the great mistake of going eastward to the Phasis, or Araxes, north of *Ararat*, and even beyond that into modern Georgia, as far as *Tiflis*; they were obliged to return almost in their own footsteps to the Harpasus, *Arpachai*, a tributary of the Araxes, which they crossed, and proceeded to the north of the last-mentioned river to Gymnias (probably *Erzeroom*); having gained the summit of the Teches, whence they descried the Euxine Sea, they easily found their way to the coast, near *Trebizond*; at this place some went by sea, and others by land to Cotyora, and then all by sea to Heraclea Pontica; here they disembarked, and made their way by land to Chrysopolis, and thence across the Bosphorus to Byzantium; they re-embarked at Perinthus for Lampascus, and so crossed the plain of Troas to Pergamus.

16 Herodotus was not the only Greek writer who travelled for the sake of information, and recorded what he learned for the benefit of his countrymen. Many, indeed, were actuated by a more scientific spirit than he showed, among whom we may mention Heraclitus of Ephesus, who journeyed to the Ocean; Democritus of Abdera, who travelled in Babylon, Persia, and Egypt; Antiochus of Syracuse, contemporary with Thucydides, who described Sicily and Italy; Ephorus, and many others, who contributed largely to the geographical literature of the day, but whose works have almost wholly perished. Two men deserve particular notice, Eudoxus, about B.C. 360, a friend of Plato, who discovered the spherical form of the world, and divided it into zones, and who also wrote accounts of various countries in which he had travelled; and Scylax, the author of the *Periplus* already mentioned, containing a description of the Mediterranean Sea, the Euxine, and the Atlantic, as far as the island of Cerne, on the coast of Libya. He must be distinguished from Scylax of Caryanda, who also wrote a *Periplus*, not extant, of the Indian Ocean; the author of the extant work lived in the reign of Philip of Macedon.

17 With the age of Alexander commences a new era in the history of geography; hitherto the knowledge of Asia was co-extensive only with the Persian empire. That great man carried his conquests to the banks of the Indus and the Oxus, and opened Northern and Eastern Asia. Nor was he only concerned with extending his dominions: he forwarded science by taking in his train professional geographers, such as Diognetus and Betus—by requiring the governors of the conquered provinces to send in descriptions of their territories—and also by sending out expeditions to explore and survey various points. To show what new scenes were opened at this time, we will commence with a brief sketch of his own military expedition. From the Granicus,

on whose banks he first engaged with the Persians, he passed southwards to Ephesus, Miletus, and Halicarnassus; thence by Patara and the south coast of Lycia, rounding the headland of Climax, to Perga; from this point he turned northwards, passing through Celænæ to Gordium in Bithynia; then to the south-east, through Ancyra and Tyana, Tarsus and Mallus in Cilicia, to Myriandrus; finding that the Persians were in his rear, he returned to Issus, and having again proved the conqueror, hastened through Cœle-Syria and Palestine, besieging and taking Tyre, Sidon, and Gaza, and visiting Jerusalem. Egypt submitted without a contest; and the Emperor's visit was chiefly celebrated by his adventurous visit to the temple of Ammon, in the lesser Oasis, and by the foundation of Alexandria; from Egypt he returned to traverse the central provinces of Asia; he crossed the Euphrates at Thapsacus, and the Tigris near *Mosul*; Gaugamela, to the south of this point, was the scene of another victory, which was followed by the capture of Babylon. Thence he passed by Susa, and through the Persian gates, to Persepolis; returning on his track to Opis on the Tigris, he passed by Ecbatana and Ragæ, through the Caspian gates, through Hyrcania, Margiana, Aria, Drangiana, and Bactriana, to Sogdiana, in which country he wintered at Nautuca; the Iaxartes was the limit of his progress to the north. He returned southwards to Bactra, and crossed the Paropamisus, *Hindookoosh*, by the route of *Bamecan*, to the banks of the Cophes *Cabool*. Below the town Nicaea he turned northwards by the course of the Choës, the same river that is also called the Choaspes or Évaspla, now the *Kameh*, to subdue the tribes of the Aspasianæ and Guræi, crossed the upper valley of the Guræus, *Pargikora*, and descended between the course of that river and the Indus, to Peucela, and along the course of the *Cabool* river to its junction with the Indus. After a second campaign northwards along the Indus, as far as Dirla, he crossed that river just above the entrance of the *Cabool*, and passing by Taxila, a town to the south-east of the modern *Attock*, he encamped on the banks of the Hydaspes, *Jhelum*, in the *Panjab*, either near *Rotas*, or, as some suppose, lower down, near *Jellalpoore*. He first effected the passage of this river at a point some miles higher, and having defeated Porus, traversed the plain that intervenes between the *Jhelum* and the Acesines, *Chenab*; thence to the Hydraotes, *Ravee*, where he found a town, Sangala, on the site of *Takore*; then, in the same direction, to the Hyphasis, *Beas*, above the point of its junction with the Hesudrus, *Sutlege*. The great Indian desert put a stop to further progress. He returned to the Hydaspes, and followed the course of that river to its junction with the Indus, and thence to Pattala, *Tatta*. He here divided his forces, despatching a naval expedition, under the command of Nearchus, to explore the coasts of the Indian Ocean and Persian Gulf, while he himself returned overland through the wastes of Gedrosia and Carmania, to Susa. His subsequent visit to Ecbatana, and afterwards to Babylon, require no notice here. An account of Nearchus' discoveries has been preserved to us in Arrian's works; he coasted along the shores of Gedrosia and Carmania, leaving the mouth of the Indus in October B.C. 326, and arriving in the Euphrates in February, 325. In addition to this, other expeditions were sent to explore the coast of Arabia under Hiero, Archias, and Androsthenes; but their discoveries were not of any great importance.

We can easily conceive that the achievements of Alexander gave a great impulse to the spirit of geographical inquiry: a host of writers followed in quick succession, who gave descriptions of the newly discovered lands. Onesicritus, a pilot, wrote an encomium of Alexander, with accounts of India and the eastern provinces of Asia. It serves to illustrate the state of knowledge in that day that he speaks of India as in size the third part of the whole habitable world, and of Taprobane, *Ceylon*, (first mentioned by him,) as twenty days' sail from the continent. Clitarchus also described India, and wrote of the Celts and Cimbri in the west. Anaximenes, Aristobulus, to whom Arrian is indebted for his materials, Callisthenes and

Hieronymus followed very much in the same track. The latter was the first Greek writer who described the antiquities of Rome. • We may also here mention Hecætæus of Abdera, a writer of the same age, who advanced out of the beaten track to describe the Hyperboreans and the Northern Ocean, which he names the Amalechium Mare, stating that it began from the river Paropamisus.

18 The east, however, was not the only direction in which the spirit of discovery found an outlet. While Alexander was pushing his conquests in Asia, a less celebrated but not less adventurous man, Pytheas of Massilia, was conducting an expedition to the north-west coasts of Europe. He was both a mathematician and an astronomer, so that his observations on the phenomena he witnessed, as the ebb and flow of the tide, the length of the day in northern climates, &c. &c., were valuable to his contemporaries. He followed the coast of Spain and Gaul, passed up the British Channel, and thence along the east coast of England; leaving the extreme northern point of Britain, he penetrated for six days into the Northern Ocean until he reached Thule. Deterred from further advance in that direction by the mists, he returned to the mouth of the Rhine, and thence to the coasts of the Baltic, where he heard of the Teutones and the Gothones. A contemporary, Euthymenes, sailed through the Pillars of Hercules to the Southern Ocean. It serves to illustrate Herodotus' notion of the Nile's course, that he represents that river as communicating with the Atlantic Ocean. Lastly, Dicaearchus, a pupil of Aristotle, combined all the discoveries of the age in well executed and valuable maps, accompanied with descriptions of the world and of particular countries. Two fragments of his work on Greece are still extant, giving descriptions of Boeotia and Attica.

19 The successors of Alexander forwarded the progress of geographical knowledge by their military expeditions, and more especially by their embassies. Megasthenes, the ambassador of Seleucus to king Sandrocottus, wrote an account of India generally, and particularly of the districts bordering on the Ganges, as well as of the island Taprobane. Daimachus and Dionysius, the former sent by Seleucus Nicator, the latter by Ptolemy Philadelphus, spent many years at Palimbothra, and published accounts of India. Patrocles navigated the Indian Ocean: he maintained the notion, of which we find traces both before and afterwards, that the Caspian was a gulf of the Northern Ocean, and that the eastern coasts of Asia might be circumnavigated. Seleucus himself undertook an expedition beyond the Indus, the details of which are little known to us; he penetrated probably as far as *Patna*.

20 In the meantime philosophy was paving the way for a more correct and scientific system of geography. Already had Plato, and after him, with greater certainty, Aristotle, perceived the spherical form of the Earth; both had also surmised the existence of other continents besides those with which their age was acquainted, and the latter had attempted to lay down the extent and the proportions of this upper hemisphere. Subsequent observations confirmed the important discovery of the Earth's real form, which was believed by all but the Epicurean school, who still adhered to the primitive notion that it was a flat surface. The views of Aristotle were disseminated by the writings of his pupils, Theophrastus the Lesbian, and Heraclides Ponticus; the former did further service by publishing a work on the topography of Italy; the preserved fragments of the latter refer to the Cimmerians and other peoples and places in the north of Asia.

21 We now enter upon a new era in the history of Geography. About the year 220 B.C., it took its place among the sciences, under the able management of Eratosthenes of Cyrene, who was born 276, and died 194, B.C. This man was educated at Athens, whence he removed to take the office of librarian at Alexandria, at the invitation of Ptolemy Euergetes. With stores of knowledge at his command, and living in a place which was at once the centre of commerce and learning, he had every opportunity of

acquainting himself with the discoveries of others in every part of the world, together with physical and mathematical science to correct and systematize the vast mass of materials before him. His work on Geography is unfortunately lost: he treated the subject methodically, dealing with the physical, the mathematical, and the political portions in separate books: he also constructed maps on mathematical principles, and was the first to use parallels of latitude and longitude. He considered the Earth to be spherical, surrounded by a firmament of similar shape, both of which revolved about one and the same axis, and had one centre. The equator was supposed to divide the hemisphere into two equal halves—a northern and a southern—and the distance to each pole he computed at 63,000 stadia, so that the whole circumference would equal 252,000 stades. From the equator he drew eight parallels at unequal intervals—the first passing through Taprobano; the second through Meroë; the third through Syene; the fourth through Alexandria; the fifth, which was deemed the great central parallel of the northern hemisphere, through the Straits of Hercules, Rhodes, Issus, the Caspian gates, and the Paropamisus; the sixth through the southern point of the Euxine; the seventh through the mouth of the Borysthenes, and the eighth through Thule. These parallels were crossed at right angles by meridians, seven in number; the central and most important passing through Meroë, Syene, Alexandria, Rhodes, Troas, Byzantium, and the mouth of the Borysthenes. He considered, that only a portion of the northern half of the hemisphere was inhabited, equal to an eighth part of the world's surface, and the extent of this he calculated at 78,000 stades in length, by 38,000 in breadth, so that the oblong shape resembled a Macedonian *chlamys*. The extreme points of the habitable world were, in the East, Thine in the land of the Seres, *China*; in the West, the Prom. Sacrum, *Cape St. Vincent*; in the South, the Cinnamon Coast of Africa, and in the North, Thule. As to the details of his geographical system, we learn from Strabo sufficient to prove that he had gone beyond his predecessors in topographical knowledge. He mentions, for instance, the rivers Anas and Tagus, and Prom. Calpe in Spain; Orkynia, the *Hercynian Wood*, in Germany; the two branches of the Nile, Astaboras and Astacus, which surrounded the kingdom of Meroë; the mountain Imaus, *Himalaya*, in Asia; the promontory of Thine in China, and the Ganges. On the other hand, it shows his ignorance in some particulars, that he represents the Ister as communicating by an arm with the Adriatic Sea, and that he conceived the Persian Gulf as equal in size to the Euxine. Eratosthenes took great pains in ascertaining the distances between different places, which in many instances he has shown with great accuracy, considering that his calculations were based on measurement only.

22 Hipparchus of Nicæa, about 150 B.C., succeeded Eratosthenes in the rank of ancient geographers. A severe critic of the statements, he nevertheless followed generally in the footsteps of his predecessor. His chief merit consists in having brought astronomy to bear upon geography, inasmuch as he learnt to fix the relative position of localities, not from measurement, but by observation of the heavenly bodies. He adopted, in his map, the meridian of Eratosthenes through Alexandria, Syene, &c., and the same separation of parallels of latitude, though with some varieties in their position. From what we know of the details of his works, the field of practical geography does not appear to have made any advance.

Polybius (B.C. 205 to B.C. 123) deserves notice as a topographical writer of great merit, and still more as having perceived the intimate connexion between history and geography. His extant works are directed, in the main, to the former science, but we know that he also wrote some treatises on geography. He is peculiar in his division of the world into six zones, instead of five; the torrid, according to his system, being divided into two by the equator. He does not appear to have promulgated any new theory, or to have indulged much in speculation. On one occasion, indeed,

he ventured an opinion, of which we find traces in the writers immediately before him, that Asia and Africa were connected in their southern extremities, and that the Indian Ocean was merely a vast lake. Generally, however, his writings are descriptive; and they probably conduced to a better acquaintance with the western nations of Europe, Syria, and the north-west coast of Africa.

During the interval that elapsed between the ages of Eratosthenes and Strabo, there were many voluminous works published, which served as authorities for the latter writer, but which have been wholly lost to us. Among these the poetical works of Scymnus of Chios, B.C. 100, and of Alexander of Ephesus—the former, descriptive of Greece, Sicily, and Italy; the latter, of the world—the treatises on Homeric Geography by Apollodorus of Athens, B.C. 140, and by Demetrius of Scepsis—the Journals of Artemidorus of Ephesus, B.C. 100, who explored the coasts of the Mediterranean and the Red Sea, and part of the Atlantic Ocean—the geographical works of Agatharchides of Cnidos, B.C. 120, and of Cornelius Polyhistor, who described the world in forty books, are frequently mentioned by later writers.

23 The valuable work of Strabo has fortunately escaped the general fate. This eminent man, a native of Amasia in Pontus, was born about the year 66 B.C., and died about 24 A.D. His whole life was devoted to the study of historical and geographical science, which he further followed up and improved by extensive travels through Asia Minor, Greece, Italy, Egypt, and Syria. His geographical treatise was written in the later part of his life, and embodies the results of his multifarious labours: it is divided into seventeen books, the two first of which are devoted to an Introduction, wherein the works of his predecessors, and especially the physical and mathematical statements of Eratosthenes and Polybius are noticed; the next eight books contain the description of Europe, the following six of Asia, and the last of Libya. Though Strabo availed himself most largely of the discoveries of his predecessors, he unfortunately underrated the writings of many who would have supplied him with valuable materials. It is a matter equally of surprise and regret, that while he sets great store upon Homer he casts aside Herodotus, and that while he cites Ephorus, Artemidorus, and others, he neglects Ctesias, Pythias, and all the Roman historians and writers. It is also to be regretted that he did not follow the example of his great master, Eratosthenes, in a more systematic treatment of his subject, and in devoting more attention to physical and mathematical geography. His aim, however, appears to have been, not to write a philosophical treatise, but to supply the 'reading public' of the day with an interesting and instructive manual of *descriptive* geography, which should serve alike for the student, the merchant, and the general reader.

In the general theory of geography he follows closely in the steps of Eratosthenes, representing the world as spherical, and surrounded with a concentric orb of sky, which moved round it from east to west, while the Earth was itself stationary. He divided the hemisphere into two parts by the equator and into five zones, and he adopted the same chief meridian through Meroe, and the same parallels of latitude and longitude. The habitable world was, according to his calculations, twice as long as it was broad, and resembled in shape a Macedonian *clamys*, the eastern and western extremities of the world being contracted like the lappets of that robe. It was surrounded on all sides by the ocean, which formed four large bays, connected with it by very narrow channels,—viz., the Caspian Sea, which was connected with the Northern Ocean, the Persian Gulf, the Red Sea, and the Mediterranean. The Northern Ocean he describes as unnavigable; nor had any one ever penetrated the channel of the Caspian Sea. The Persian Gulf lay due south of the Caspian, and the Red Sea in a similar position with respect to the Euxine. The Mediterranean far exceeded the others in size, and consisted of numerous basins, as the *Ægean*, the *Euxine*, &c. This sea, together with the range of Taurus to the east, divided the world



into two halves—a northern and a southern division—which, however, did not lead Strabo to reject the generally accepted distinction of the three continents, Europe, Asia, and Africa.

In his description of particular lands, there are numerous and glaring errors: Spain, for instance, is represented as a parallelogram, like a 'hide stretched out,' separated from Gaul by the Pyrenees, which would thus run from north to south, parallel to the west coast. Celtice, or France, is also very much misshapen; the Pyrenees and the Rhine form the boundaries to the east and west, the Ocean and the Alps to the north and south, but the sea coast, it will be observed, runs in his map straight from Spain to the Rhine and Elbe, the peninsula of Brittany and the Bay of Biscay being altogether omitted. This great error led him into a further mistake as to the position of Britain, which he describes as triangular in shape, its longest side, which runs parallel to Gaul, terminating in two promontories, the eastern opposite the mouth of the Rhine, the western opposite to Aquitania and the Pyrenees. Strange as the latter statement may appear, it is not so very inconsistent with his calculation of the length of the Celtic coast, which, from the Pyrenees to the Rhine, amounted to only 4300 stades. Ierne, *Ireland*, lay to the north of Britain, and beyond that no one could penetrate on account of the cold. No notice is taken of Thule, nor yet of the discoveries of Pytheas to the east of the Elbe, which river he makes the limit of the known world in that direction. He perhaps conceived the coast carried on in a straight line as far as the outlet of the Caspian Sea, whence it commenced a gradual decline to the south-east, thus cutting off the vast regions of China, Siberia, and Mongolia. Thina, the most easterly point, lay in the latitude of Rhodes, at the termination of the great central range of Imaus, near which point the Ganges reached the sea, flowing from west to east. The coast then trended southwards to Prom. Coliacum, *C. Comorin*, and the island Taprobane, and returned thence to the westward in nearly a straight course. The continent of Asia was divided into two parts by Taurus—viz., Northern Asia, which was subdivided into four districts:—1. The lands between the Tanais and the Caspian Sea; 2. Those to the eastward of that sea; 3. The countries lying along the range of Caucasus, as Media, Armenia, Cappadocia, Cilicia, &c.; 4. Asia Minor within the Halys, and Southern Asia, which included India, Ariana, Persia, Mesopotamia, Syria, and Arabia. Africa took the shape of a right-angled triangle, the Red Sea and the Mediterranean representing the sides containing the right angle, and a line stretching across the Desert from a point south of *C. Guardafui* to the *Straits of Gibraltar*, forming the hypothenuse. His account of this continent is scanty, and adds nothing to the discoveries of his predecessors. He mentions the two branches of the Nile, Astacus and Astaboras, and also a lake, *Pseoba Dembea*, in Abyssinia. In this continent, indeed, geography had actually lost ground during the five hundred years that elapsed between Herodotus and Strabo.

24 The wars of the Romans brought distant tribes, particularly of the north and the west, into contact with the civilized world, and tended to a considerable enlargement of the field of practical geography. Thus, the wars in Spain against Viriathus and Sertorius (b.c. 149—133, and 80—72), the campaigns of Cæsar in Gaul and Britain (b.c. 56—50), of Augustus in the countries about the Danube (b.c. 15), of Drusus, Tiberius, and Germanicus (b.c. 12 to a.d. 16) against the Germans, followed up as they were by the establishment of military colonies and the formation of roads, led to an intimate knowledge of these quarters. But the greatest service was done by the survey of the Roman empire, commenced by Cæsar and completed by Augustus, which comprised a description and measurement of every province, accompanied by charts and tables. The most celebrated Greek geometers—Zenodorus, Theodotus, and Polycleitus—were employed in the work, and an impetus was given to the study of practical geography, the effects of which may be traced in all the historical writings of the Augustan age—Sallust, Cæsar, Tacitus, and others.

The characteristic feature in the Roman school of geography consists, as

the genius of the Roman people would lead us to expect, in the predominance of the *practical* over the philosophical element. Indeed, no advance was made by them in the study of the physical or mathematical branches of the subject, in which respects they adopted the opinions of the Alexandrine school. Rome, nevertheless, produced two very illustrious geographers—Pomponius Mela and Pliny. The first of these, by birth a Spaniard, lived in the reign of Claudius. His extant work entitled, *De Situ Orbis*, consists of three books, in which he delineates the form and relative position of the countries of the known world. He takes the sea as his guide, and in the first book describes the African and Asiatic coasts of the Mediterranean Sea, with the adjacent provinces; in the second book, the maritime provinces on the European coast of the same sea; and in the third, the countries adjacent to distant seas, as India, Germany, &c. He is more exact than his predecessors in his account of the western and northern countries of Europe, and especially of Britain and Ireland; but in his account of the south and the east, he falls back to the age of fabulous geography, and peoples the world with sphynxes, griffins, and other fanciful creatures. He expresses his belief that Africa had been circumnavigated by Hanno and Eudoxus; and he surmises that Ceylon was the commencement of another continent, as no one had yet sailed round it. He held it probable that, in the southern hemisphere, beyond the ocean, an unknown continent existed, inhabited by Antichthones, and he conjectured that the Nile had its springs there, and passed under the ocean by a subterraneous passage, to re-appear in this northern continent.

Pliny, who flourished between the years 23 and 79 A.D., devoted four out of the thirty-seven books of his work on natural history to geography. To his unrivalled industry in collecting information, both from reading and conversation, he added the advantage of having travelled in Spain, Gaul, Germany, and Africa. His work bears few traces of originality, being chiefly a compendium of the statements of former writers, who often contradict or vary from each other; still there are, occasionally, valuable hints as to the productions and peculiarities of districts, and the customs of their inhabitants. It is unnecessary to present any detail of his statements, as but little fresh ground was broken by him. He surpassed Mela in knowledge of the East, as he correctly affirms Taprobane to be an island, and not the commencement of a new continent: he also seems to have had some knowledge of the Arctic regions; for he tells us that in Thule and the Riparian mountains there was only one day and one night in the year. He also mentions the Sinus Codanus, and the islands, Scandinavia and Baltia. The interior of Africa had been penetrated to some distance from the coast, and he gives accounts of Mount Atlas, the course of the Niger, and of various towns on its banks. Asia, to the north of the Iaxartes, and to the east of the Ganges, remained a *terra incognita*.

25 The study of Ancient Geography attained its greatest perfection under Claudius Ptolemy, the founder of the later Alexandrian School. This celebrated philosopher flourished at Alexandria about the middle of the second century after Christ. Besides several mathematical and astronomical works bearing upon the science of geography, he composed a work directly bearing on that subject in eight books, which was deemed the most perfect system of geography during the middle ages, and even down to the sixteenth century. Ptolemy does not deserve, nor indeed does he claim, all the gratitude that posterity have bestowed upon him; much of the valuable materials in his work had been previously collected and arranged by Marinus of Tyre (about 150 A.D.), whose writings, themselves lost, are embodied in the work of Ptolemy. The great merit of Marinus consists in his having fixed with greater certainty the latitude and longitude of the most famous towns and places, by a careful study of Itineraries, compared with the measurements recorded in earlier works. He drew maps upon a new principle, increasing the number of the parallels, still however retaining the great error of making them cut each other at right angles, and proceed in *right*, instead of *curved* lines.

In his description of the world he is clear and methodical, commencing with the places between the two most northern parallels, which he goes through from west to east, and thence going southwards through the separate intervals to the equator. In knowledge of topography and general geography, Ptolemy is far in advance of Strabo. The imaginary limits of the world to the east of Asia and the south of Africa had been exploded by recent discovery, and these continents now stretched out in an unlimited expanse of land, unencircled, as far as experience could decide, by any circumambient body of water. The well-known countries of the world had received very nearly their correct shape and size. The only fault in the form of Spain consists in its being somewhat elongated; the western side of France receives its due curve by the introduction of the Bay of Biscay; Great Britain—Albion, as he calls it—is no longer triangular, but extended towards the north, with a singular distortion, however, in its northern half, which is made to bend considerably to the east. Ireland is no longer represented as lying to the north, but to the west of England; still the old mistake may be traced, in its being placed too much to the northwards, its northern point being higher than the extremity of Britain. No great advance had been made in the knowledge of the north of Europe; Scandia is still mentioned as an island; the Baltic as a part of the Northern Ocean: the Chesusus, *Dvina*, was the limit of his knowledge in that direction; he mentions the Cimbric Chersonese, the Danish isles, and the Sinus Venedicus of the Baltic. The coasts of the Mediterranean are tolerably correct; the peninsula of Greece is produced below that of Italy; and Sicily is brought into its true latitude. The peninsula of Italy is, however, from some cause or other, unduly directed to the eastward. His description of the Euxine, and of the great rivers falling into it, is tolerably full and correct.

In Asia, discovery had made great strides. The Caspian was now known to be an independent body of water, though its direction had not been ascertained; for it was still thought to lie east and west. The constant traffic across the Imaus with the Seres had led to an acquaintance with *China* and the region of *Cochin China*, while navigators had coasted along the shores of the *Bay of Bengal* to the *Aurea Chersonesus*, *Malay Peninsula*, and even to the Sinus Magnus, *Gulf of Siam*. India is misshapen in outline, the peninsula not being produced sufficiently towards the south: the interior, however, with its towns, rivers, &c., is very particularly described.

Africa, the native soil of Ptolemy, was the least known of the three continents. On the east coast his knowledge extended to Prom. Prassium, probably *C. Del Gado*, which appears to have been the extreme point to which the coasting trade was carried. Thence, he supposed the coast to trend off to the east, until it formed a junction with the south-eastern extremity of Asia. He mentions an island, Menuthias, opposite to the Prom. which some have taken for *Madagascar*, but which should rather be identified with *Pemba*, or one of the lesser islands on the coast of *Zanguebar*. On the western coast, no advance had been made since the days of Hanno: the Fortunatæ Insulæ, *Canaries*, occupy a prominent place in his system, as the spot whence he reckoned his longitude. The rivers which he mentions are difficult to identify. In the interior we meet with notices of one, which can hardly be any other than the Niger, with various towns on it, *Gana*, *Tagana*, &c. The Mountains of the Moon with the sources of the Nile are also mentioned, but the Desert is very much contracted in breadth, and the interior is thus brought into too northerly a latitude.

26 The history of Classical Geography is generally considered to end with Ptolemy. No one followed him worthy of the title of geographer in the proper sense of the term; nor was anything new added either to the science or the practice of that branch of knowledge. There are, nevertheless, some few names worthy of record of men who have illustrated particular provinces or subjects. Of Greek writers, Arrian and Pausanias stand foremost; the former was born towards the end of the first century, at Nicomedia, and died in the reign of Antoninus Pius. He wrote a history of Alexander's expedi-

tion, a treatise on India and its inhabitants, and a survey or (as it is named) *Periplus of the Euxine Sea*, which was undertaken by the command of the Emperor Hadrian, full of interesting information as to places, harbours, and the tribes dwelling on the coast of that sea. Pausanias, his contemporary, travelled extensively in Greece, Macedonia, Asia, and Africa. He published a topographical description of Greece in ten books, with accounts of the various public buildings as they appeared in his time. This work contains numerous incidental notices of distant countries, some of which betray a tendency to credulity in the author. Agathemerus, who lived about the commencement of the third century, was the author of an epitome of geography of no great merit, extracted chiefly from the larger work of Ptolemy. He reiterated the exploded errors that the Caspian Sea was a bay of the Northern Ocean, and that Britain stretched from Spain to Germany. Dionysius Periegetes, the author of a geographical poem, lived, in all probability, towards the end of the third century. He adopted the earlier system of Eratosthenes and Strabo, and therefore deserves no praise as a geographer; nevertheless his poem seems to have been extensively used for purposes of instruction, as it underwent several revisions and commentaries, and was twice translated into Latin.

To this period are to be assigned various anonymous writings in the form of *Peripli*, descriptions of coasts and seas. Such are the *Periplus of the Red Sea* assigned to Arrian, a *Periplus of the Great Sea*, another of the *Euxine*, and another of the *Euxine and the Maotic Gulf*. Marcianus of Heraclea, at the beginning of the fifth century, composed a work of this nature, entitled a *Periplus of the Outer Sea*, descriptive of the coasts of India and Persia, the north and west of Europe, and the east and west coasts of Africa. But the most valuable work of this age, unfortunately almost wholly lost, was the *Geographical Dictionary* of Stephanus of Byzantium, who flourished in the commencement of the sixth century. This was a species of encyclopædia of geography, compiled with great care and industry, in which towns, islands, and people, were described in alphabetical order, with historical, ethnological, and mythological notices. All that has come down to us of this most useful book is an epitome, very imperfectly put together, from the hand of Hermolaus, towards the end of the seventh century.

27 Lastly, we must not omit mention of the Roman *Itineraries* as a most important and authentic authority in respect to ancient geography. These were of two sorts, either written or illustrated: the first contained merely the names of places on the several routes, with the distances from each other; the second, a painted description of the routes, and the towns, rivers, forts, and other objects along their courses. Of the former species we possess several specimens—viz., the two *Itineraries of Antonine*, the one containing an account of almost all the main roads in the Roman empire, the other the usual lines of traffic by sea; the *Itinerary of Jerusalem*, compiled by a Christian of the fourth century, giving an exact description of the route from Bourdeaux to Jerusalem; and the *Itinerary of Alexander*, designed for the use of the Emperor Constantine in his campaign against Persia. Of the second species, one specimen only, and this probably only a copy of the original, has descended to us. This is commonly called the *Peutingerian Table*, after the name of its possessor, Conrad Peutinger. It was executed about 230 A.D., and was designed to be hung up for reference in a colonnade. The routes are depicted in straight lines, without regard to deviations, with memoranda as to the distances from place to place, the names of provinces, cities, woods, and lakes.

We now take leave of the history of Classical Geography, and proceed to review the materials which the writers, whose lives and works we have briefly noticed, have left for our information. Preserving as far as possible the order which history suggests, we shall begin with Asia, the cradle of the human race, and the scene of the earliest political and historical events with which we are acquainted.

## CHAPTER II.

### I. ASIA. — II. ASIA MINOR.

#### I. Asia.

THE name ASIA is of doubtful etymology: its use may be traced up to the time of Homer, who speaks of the 'meadow of Asia' about the Cayster, and of the Asiones who inhabited it. When the name was transferred from this locality to the continent, is uncertain: we meet with it in this extended sense in Æschylus and Pindar. Asia was bounded on the W. by the Tanais, Palus Maotis, Pontus Euxinus, Mare Internum, and Sinus Arabicus; on the S. by the Mare Australe; on the E. by the Oceanus Eous; and on the N. by the Oceanus Scythicus.

The mountain systems of Asia are simple and clearly defined: from the extreme west proceed two ranges, Taurus and Caucasus, the latter from the north, the former from the south of the Euxine Sea, which gradually converging, form a junction in Armenia, and thence proceed in a due easterly direction to connect with the Himalaya and the other chains of Central Asia. Taurus takes its rise in Lycia, and follows the coast of the Mediterranean as far as the confines of Syria and Armenia: there it divides, one branch, the Antitaurus, taking a northerly direction towards the Euxine, and connecting with Scordisus and Paryadres, offsets from the Caucasian range, while the other continues its easterly direction, and under the name of Niphates, joins Mount Abus, the southern limb of Caucasus. Caucasus takes its rise at the eastern side of the Thracian Bosphorus, and pressing close upon the Euxine as far as its coast preserves an easterly direction, forsakes it when it trends to the south, and crosses the intervening space to the shores of the Caspian. In its course it sends forth lateral ranges, the Moschici Montes in Colchis, and the Abus range in Armenia, which contains the sources of the Euphrates and Araxes, and culminates in Mount Ararat. The former connects, as has been already observed, with Antitaurus, the latter with Niphates, the continuation of Taurus. From the point of junction to the east of the Tigris, the direction of the Caucasian range is preserved in a south-easterly range called Zagrus, which follows the valley of the Tigris, and the coast of the Persian Gulf, and declines in the plains north of the Arabian Sea. The main ridge of Caucasus and Taurus meanwhile preserves a due easterly direction, skirting the southern coast of the Caspian Sea, where it received the name Caspius, *Elburz*, and rising to its greatest height in M. Coronus, *Demavend*: then passing between Asia and Margiana, under the name of the Sariphi Montes, it finally united with the Paropamisus, containing the sources of the Indus and the Oxus.

The easterly direction is still preserved in the Imaus and the Emödi Montes, which together make up the *Himalaya* range, terminating in the Bepyrrus, containing the sources of the Doanas, *Irawaddy*, and in the Damassi and the Samanthini Montes in *Cochin-China*. The northern branch of the Imaus,\* the *Bolor*, sends forth the great range of *Kuenlun*, distin-

\* The ancients seem to have been aware of the existence and position of the four great ranges which constitute the framework of Central Asia; but their accounts of them are confused, and it is with only a certain degree of probability that we can identify their descriptions. This uncertainty may partly be attributed to the indefinite application of the name Imaüs, which, like Taurus and the modern Alps, seems to have been significant of any high range of mountains. In etymology it resembles *Himalaya*, and from the description of Ptolemy it would represent the western half of the Himalaya range: at the same time as geographers divided Scythia into two parts, Intra and Extra Imaum, they must have included under that name the range now called *Bolor*, which runs northward from the Indian Caucasus.

guished by the ancients as the Emodi Serici, which bound the plain of *Gobi* on the south, having a continuation, the Cavii Montes, in *China*, containing the sources of the Bautisus, *Hoang-ho*: beyond these, to the north, lay the Asmiræi Montes, bounding on the east the territory of the Issedones, the modern *Mongolia*. Returning to the central range of *Bolor*, the Comedarum Montes represent the *Thian-shan* range, while the Sogdii and Oxii Montes, which bounded Sogdiana to the north, and contain the sources of the Iaxartes, correspond with *Kara-tagh* and *Ak-tagh*, the westerly continuations of the *Thian-shan* range towards the Caspian Sea. The mountains that lay furthest to the north—the Annibi, Amarœi, and Auxacii Montes—were probably various ranges of the *Altai*, north of *Mongolia*.

Next to the mountain ranges, the rivers demand our attention, as influencing the political divisions of this continent. A particular account of these belongs to the description of the countries with which they are connected: in this place it is only necessary to state, briefly, the relative positions and direction of the most important streams.

From the southern declivities of the great central chain, four large rivers pour their waters into the Indian Ocean, in the following order, from W. to E., the Euphrates, the Tigris, the Indus, and the Ganges, which to this day preserve their classical names. The Euphrates rises in the highest mountains of Armenia, one of its streams issuing from M. Paryadres, the other from M. Abus: it follows the south-westerly direction of the lower Caucasian ranges, until it is turned by Antitaurus: thenceforward it flows in a south-easterly direction to the Persian Gulf. The Tigris has a considerably shorter course: it has its rise in M. Niphates, and, striking to the south-east, preserves the same direction, with very slight deviations, to the Persian Gulf, running parallel with the Zagrus range on its left bank, and gradually converging to, until it forms a junction with, the Euphrates. The Indus rises on the southern declivity of Paropamisus: its course is southerly, with a slight inclination to the westward: receiving numerous and important tributaries from the eastward, it closely follows the ridges of the *Sooliman Mountains*, and flows into the Indian Ocean. The Ganges rises in the Emodi Montes: thence, in a south-easterly course, it follows the general direction of the Himalaya range, receiving all the streams that flow from it, and discharging itself into the Sinus Gangeticus, *Bay of Bengal*.

On the northern side of the great central range there are two important water-basins, the Caspian Sea and the Sea of Aral. Of the rivers that flow into the former, the most important are the Cyrus, *Kur*, the Rha, *Volga*, and the Daix, *Oural*. The Cyrus has its rise in the Coraxici Montes, the southern limb of Mount Caucasus: it runs in a south-easterly course, parallel to the main ridge of Caucasus, and after having received the Araxes, *Aras*, a river of equal importance, discharges itself into the Caspian Sea. The Rha and the Daix come from the north, rising, the first to the west, the second to the east of the Hyperborei Montes, and flowing in parallel courses into the Caspian. The Aral Sea\* receives two important streams, the Iaxartes, *Sirr*, and the Oxus, *Gihun*, which, in all ancient accounts, however, are represented as flowing into the Caspian. The Iaxartes—the Araxes of Herodotus—rises in the Oxii Montes, and in a north-westerly course seeks the Aral Sea: the Oxus rises in Paropamisus, and consequently has a more northerly direction than the Iaxartes: there is little doubt, that at one time it actually flowed into the Caspian Sea, but that its course has been diverted by the accumulations of sand which it has deposited.

Having thus laid down the prominent physical features of the continent

\* The Aral Sea is not mentioned by any geographer but Ammianus Marcellinus, in the fourth century. Ptolemy certainly mentions a lake, Palus Oxiana, and P'iny, Oxus Lacus, but these notices refer to some small mountain lake in connexion with the Oxus, rather than to the Aral Sea.

of Asia, it remains for us to sketch out the main territorial and political divisions noticed by ancient writers.

The north of Asia was divided into three parts:—1. Sarmatia from the Tanais to the Rha, and southward to the Euxine and Caspian Seas: 2. Scythia from the Rha in the W., to the borders of Serica in the E., and separated on the S. by the Oxus and the Oxii Montes from Sogdiana, and by the Imaus and Emodi Montes from India: and 3. Serica, northern China, eastward from Scythia to the sea. Below Serica lay the region of the Sinæ, in *Cochin-China*; and below Eastern Scythia, India, divided into Intra Gangem, *Hindoostan*, and Extra Gangem, the *Birman empire*. The Indus formed the eastern boundary of the Persian empire: the provinces that lay between that river and the Tigris were comprehended under the general name of Persis. Westward of the Zagrus range, to the banks of the Tigris, lay Assyria, now *Koordistan*, reaching northwards to the Niphates range, and touching Susiana in the S.: between the Tigris and Euphrates were Babylonia, *Irak-Arabi*, from the point where the two rivers converge to the Persian Gulf: and Mesopotamia, *Algesira*, above the point of convergence to the Masius Mons. To the north of Assyria and Media lay Armenia, bounded on the N. by the river Cyrus, and on the W. by the ranges of Scordisus and the Moschici Montes; the high land between the Euxine and Caspian Seas was occupied by the small territories of Colchis, Iberia, and Albania. The large peninsula that runs westward from Euphrates to the borders of Europe, between the Black and Mediterranean Seas, is usually called Asia Minor, *Anatolia*. The eastern coast of the Mediterranean was divided between Syria and Palestine: while the Arab tribes occupied the vast sandy plain which intervenes between the Euphrates and the Red Sea, and which still retains the name *Arabia*.

## II. Asia Minor.

§ 1. General description. — 2. Political divisions. — 3. Mysia. — 4. Lydia. — 5. Caria. — 6. Lycia. — 7. Pamphylia. — 8. Cilicia. — 9. Cappadocia. — 10. Lycaonia and Isauria. — 11. Pisidia. — 12. Phrygia. — 13. Galatia. — 14. Bithynia. — 15. Paphlagonia. — 16. Pontus.

1 ASIA MINOR is the name assigned to the collection of provinces, which lay westward of the river Euphrates to the Ægean Sea, and between the Euxine and the Mediterranean seas. It includes certain districts, which would more naturally be reckoned as belonging to Armenia; such as Armenia Minor, Cataonia, and Commagene, which are separated from the main peninsula of Asia Minor by the Antitaurus range. The name Asia Minor is of comparatively modern date, not appearing before the fourth century of our era. Classic writers applied no general name to it; but they designated various portions of it as Asia within the Halys, Asia cis Taurum, and the Roman province of Asia propria.

The peninsula is formed by continuations of the great Asiatic ranges of Taurus and Caucasus; the former running parallel to the south coast from Lycia to Cilicia, and turning northwards on the borders of Syria; the latter following the line of the Euxine Sea, and ultimately crossing the Bosphorus into Europe. These ranges received various names in the provinces through which they passed, Taurus and Caucasus being general names significant of any high ridge. The Taurus range commences in the S. W., opposite the isle of Rhodes, with Prom. Sacrum, passing upwards through Lycia with the ridges Climax and Chimæra, it takes an easterly direction through Pamphylia: in Cilicia it sends out several offsets, such as Cragus and Imbarus, but leaves a considerable plain to the eastward of these, in that part of the province called Cilicia Campestris. At the north-eastern extremity of this province it divides; one limb, Antitaurus, *Ildestagh*, strikes off to the N., bounding the basin of the Euphrates, and uniting with Scordisus and the other Caucasian ranges; it attains its greatest height in M. Argæus,

*Ardschischä* in Cappadocia; another limb, M. Amānus, *Almadagh*, turns sharp round to the S., pressing close upon the Mediterranean Sea near Issus, and afterwards connecting with the Syrian Libānus; while the main ridge of Taurus retains its original easterly course. In the N., M. Scordisus, or Scordises, *Chisheshi*, forms the connecting link between Antitaurus and Caucasus; the course of this important range may be traced through Pontus in the rugged Paryadres, *Kuttay*, and further onward in the Bithynian and Mysian Olympus, and in numerous inferior ranges along the western coast. Between the two high ranges which thus form the framework of the peninsula, lies an extensive plateau of level pasture land, severed from the coast districts by a continuous mountain wall.

A glance at the courses of the river will show that the *fall* of the country is toward the north; thither flow the Sangarius, the Halys, and the Iris, the most considerable rivers of Asia Minor. The Halys, *Kizil-irmak*, is by far the largest and most important; it rises on the south side of M. Scordisus, follows the direction of Antitaurus into Cappadocia, curves round in the plains of that province, and passing through Galatia, falls into the Euxine on the borders of Pontus and Paphlagonia. The Sangarius, *Sakkariyeh*, rises in central Phrygia, skirts the base of the Olympus range, and after a most sinuous course, in which it preserves mainly a north-westerly direction, joins the Euxine to the eastward of the Bosphorus. The Iris, *Yeshil-irmak*, receives the waters that flow from the mountain ranges of Pontus; two large streams contribute to form it, the Lycus from the E., rising on the north side of Scordisus, and the Scylax from the W. The rivers that flow into the Mediterranean from M. Taurus are necessarily short, as that range seldom admits any passage from the interior. The Sarus, *Sihun*, and the Pyramus, *Jyhuu*, in Cilicia, form exceptions to this rule, both rising to the northward of Taurus, and having a course of considerable length. The southern provinces are, however, well provided with water, as the streams, though not large, are frequent and well filled. They bring down large quantities of deposit, which in many cases, as in the Eurymædon and the river of Tarsus, barred the entrance to vessels of any size; and in some instances, has considerably changed the lower course of the rivers.

The interior of Asia Minor is so level as not to admit of a watershed; hence the numerous lakes with which Phrygia abounds, Tatta lacus, Caralitæ, and others. Towards the west of this province the higher ground declines towards the Ægean, and breaks up into wooded ridges, such as Temnus, Ida, and Gargæus, in Mysia; Sipylus and Olympus, in Lydia; and Messôgis and Pactyas, between that province and Caria. The rivers flowing between these ridges have carried down vast quantities of alluvial soil, which being deposited at their mouths, has formed new ground, and has in many cases materially altered the line of the coast. Thus, the Mæander has pushed out so much land as to enclose the island of Lade, and fill up the Sinus Latmæus. The same fate has befallen the island Leuce, at the mouth of the Hermus; the advance of the land in that locality was remarked by Pliny, who states, that at one time Temnus stood at the mouth of the river, but that when he wrote the land reached to the rocks called the Myrmæces; those have since been added to the continent, and are now enclosed in an alluvial plain. The Hermus, *Koduschay*, rises in M. Dindymus, in Phrygia, traverses the region Catacecaumône, and the rich valley of Lydia, receives in its course two tributaries, Hyllus and Cogamus, and joins the Ægean in the bay called after it, Hermæus Sinus. The Mæander, *Minder*, rises more to the southward in Phrygia, passes between the ranges of Messogis and Cadmus, the former of which it skirts for some distance, and receiving the Harpæus and Marsyas from the S., discharges its waters into the Ægean, just to the north of M. Latmus.

The high land in the interior abounds with traces of volcanic agency; the most remarkable instance of its effects is witnessed in the district called Catacecaumône—i. e., the *burnt* land, on the borders of Lydia and Phrygia, a



plain of lava and scorix; hot springs and caves emitting mephitic vapours are common; while the ruins of once flourishing cities attest the violence of the earthquakes with which these regions have been visited.

The coasts of Asia Minor are very varied; the northern approaches nearest to regularity, for with the exception of a considerable sweep to the northward in Paphlagonia, where there are two promontories, Carambis, *Kerempe*, and *Lepte* or *Syrias*, *Indsche*, there is no deviation worthy of notice. The outline of the western coast is, on the other hand, singularly irregular; from the Propontis two bays project inland, the Sinus *Astacenus* and Sinus *Cianus*, divided from each other by the M. *Arganthonius*, and Prom. *Posidium*. The bays on the coast of the *Ægean* are very numerous; the most remarkable from N. to S. are:—the Sinus *Adramyttius*, opposite the island *Lesbos*, also called *Idaicus*, from the proximity of the M. *Ida*; the *Elaeus Sinus*, which receives the waters of the *Caicus*; the *Hermæus Sinus*, *Bay of Smyrna*, receiving the *Hermus*; the Sinus *Caistriæus*, receiving the *Cayster*, terminated to the south by the M. *Mycæle* and Prom. *Trogilium*, opposite *Samos*; the Sinus *Latnæus*, into which the *Mæander* flows; the Sinus *Iasius*, and Sinus *Ceramicus*, in *Caria*, the latter terminating with Prom. *Scandaria*, in the N., and Prom. *Triopium*, *Cape Krio*, in the S. The southern coast is also irregular, but the irregularities are on a larger scale. The bays and promontories are as follows from W. to E.:—the Sinus *Schonus*, in *Caria*, with Prom. *Cynossema* at its eastern entrance; the Mare *Pamphylum*, a considerable gulf between *Lycia* and *Cilicia*, terminated by Prom. *Sacrum*, *C. Khelidonia*, in the former, and Prom. *Anemurium*, *C. Anemour*, in the latter province; and the Sinus *Issicus*, *Bay of Scanderoon*, at the north-eastern extremity of the Mediterranean.

2 The earliest settlers in the eastern provinces of Asia Minor appear to have been of the Syrian race: their descendants occupied, in historical times, *Cilicia*, *Cappadocia*, *Pamphylia*, and parts of *Paphlagonia* and *Lycia*. The western provinces were occupied by *Thracian* tribes, probably the remnant of that important race which crossed over the *Bosphorus* into Europe: such were the *Mysians*, *Mæonians*, *Bithynians*, *Carians*, and *Phrygians*. To these original elements of population we must add some settlements of *Pelasgi* on the western, and of the *Phœnicians* on the southern coast, which existed in ante-historical times.

In the Homeric era there were three empires in existence—the *Trojan*, *Phrygian*, and *Lydian*, the last of which survived, and under the reign of *Cresus*, embraced the two former, extending over all the countries west of the *Halys*. The century succeeding the *Trojan* war witnessed the successive immigration of the *Hellenic* tribes, in consequence of the return of the *Heraclids*. These divided the western coast between them, the *Æolians* occupying the northern portion from *Abydus* on the *Hellespont* to the *Hermæan Gulf*, the *Ionians* following them from the *Hermæan* to the *Iasian Gulf*, and the *Dorians* occupying the south-western coast of *Caria*. These colonies attained such importance as to give the distinct appellations, *Æolis*, *Ionia*, and *Doris*, to their respective districts.

The *Lydian* empire—the first of any great importance in Asia Minor—ceased with the capture of *Sardis* by *Cyrus*, B.C. 546; and the whole of the country, east and west of the *Halys*, was merged in the great *Persian* empire. In the political subdivision established by *Darius*, Asia Minor constituted four out of the twenty satrapies, the various tribes occupying the same ground as before, and giving name to the districts they occupied. During this period, *Phrygia* included, besides the province so called by the Romans, *Mysia*, *Galatia*, and *Lycaonia*; and *Cappadocia* extended over *Pontus* to the borders of *Colchis*.

The conquests of *Alexander*, B.C. 334—323, transferred Asia Minor, with the rest of the *Persian* empire, to the *Macedonian* kingdom. After his death, the largest portion of it—viz., the provinces *Phrygia*, *Lycia*, and *Pamphylia*—fell to the share of *Antigonus*; *Lydia* to *Menander*; *Mysia* to *Leonatus*;

and Cappadocia to Eumenes. In the meantime, various states, which before the conquests of Alexander had yielded only a nominal supremacy to the Persian kings, established their independence. Thus Bithynia, Cappadocia, Paphlagonia, and Pontus, became separate kingdoms; and shortly after the death of Alexander, Pergämus also, which under Eumenes II. (B.C. 197—158) extended over the whole of western Asia Minor. The dominant power, however, during the era succeeding Alexander, was the Syrian dynasty of the Seleucids, which obtained all the dominions of Antigonos and Eumenes, and which retained a supremacy until the entrance of the Romans. A new territorial division arose through the entrance of a Celtic tribe—the Galatæ, or Gallo-Græci (B.C. 278): invited by Nicomedes I. of Bithynia, they poured over in vast numbers from Europe, and finally settled in the northern part of Phrygia, where they established an independent republic.

The Romans first gained footing in Asia about 200 B.C., and by friendship or arms, the whole of Asia Minor fell into their hands. The kingdom of Pergämus was bequeathed to them by the last king, Attalus III. (B.C. 133), and was formed into the province Asia; Bithynia became theirs in a similar manner, by the will of Nicomedes III. (B.C. 75); Cilicia was subdued by Pompey (B.C. 66); Pontus and Paphlagonia ceased to be independent after the third Mithridatic war (B.C. 64); Galatia and Lycaonia did not fall in until the death of the Tetrarch Amyntas (B.C. 25); Cappadocia (A.D. 17) at the death of Archelaus; and finally Lycia and Armenia Minor, after having been transferred from hand to hand, were annexed by Vespasian. Asia Minor was divided by the Romans into seven provinces: Asia (i. e., Mysia, Lydia, Caria, and Phrygia); Lycia; Cilicia, with Pamphylia; Cappadocia; Galatia, with Lycaonia; Bithynia, with Pontus; and Armenia Minor. Lastly, under Constantine's division, it formed a portion of the *Prefectura Orientis*, which contained in all five dioceses: Cilicia and Isauria were annexed to the Diocese of the East; the old province of Asia, with the adjoining districts, formed the Diocese of Asia (*Asiana Diæcesis*), subdivided into eleven provinces; and the eastern districts formed the Diocese of Pontus, also divided into eleven provinces.

3 In the north-west corner of Asia Minor lay *MYRIA*, a mountainous, well-wooded district, bounded on the N. by the Propontis, on the W. by the *Ægean* Sea, on the E. by the range of the Mysian Olympus and the valley of the Rhyndæus, which divided it from Bithynia and Phrygia; and on the S. by the Temnus range, dividing it from Lydia. It is supposed to derive its name from a Celtic word signifying 'swampy land.'

The physical features of this district suggested to the ancients a twofold division: the northern portion of it inclining towards the Propontis was named Mysia Minor, Hellespontica, or Olympene; the southern, with the streams flowing towards the *Ægean*, Mysia Major, or Pergamene. The chief mountain ranges were—1. *Ida*, *Ida*, which runs from south-east to north-west, in a course nearly parallel to the sea, containing the sources of the Simois, Scamander, Granicus, &c., and attaining its greatest height in Mount Gargärus. 2. Temnus, *Kara-dagh*, which skirted the southern and eastern boundaries of Mysia, and forms a junction with Olympus in the north-east: it contains the sources of the Macestus, Caicus, and Mysius. And 3. Olympus, *Cheshish*, on the frontier of Bithynia.

The only river of importance in point of size—the Rhyndæus, *Lupad*—flows into the Propontis: rising in Phrygia, it enters Mysia between the ranges of Temnus and Olympus, follows the base of the latter northwards, and having received the Macestus, *Suku*, from the south-east, not far from its mouth, joins the sea at the western point of the Cianus Sinus. On its banks Lucullus defeated Mithridates (B.C. 73). The other streams flowing into the Propontis are the *Æsepus* and the Granicus, *Kodsha Su*, which both rise in M. Cotylus; the latter is the most westerly of the two, and celebrated for the victory gained by Alexander over Darius (B.C. 334). The

Hellespont receives numerous small streams from the range of *Ida*, insignificant in themselves, but deriving an interest from the Homeric poems: such as the *Percôtes*, *Practius*, *Sellêis*, *Rhodium*, and *Simois*, *Ghiumbre*. The last of these rises in *M. Cotylus*, receives about two miles from its mouth the *Scamander*, or *Xanthus*, *Mendere*, and joins the sea above the promontory of *Sigæum*. The ancients represent the *Scamander* as the most important, and the *Simois* as the tributary; the latter was, however, the larger stream, but not so much esteemed, as its waters occasionally failed. These streams now lose themselves in a marsh, the sea-coast having advanced through the accumulation of sand which they have brought down. In the southern part of the province we meet with two rivers—the *Evênus*, *Sandarli*, and the *Caicus*, *Aksu*; both having their sources in *M. Temnus*, and flowing into the *Elæus Sinus*. The latter receives the tributaries, *Mysius*, *Bergma*, *Cetius*, and *Selinus*. The line of the coast is irregular, and contains the following headlands: *Abarnis*, on the Hellespont, near *Lampsæus*; *Rhœteum*, south-west of *Abydos*; *P. Sigeum*, *Jenidscheer*, at the southern entrance of the Hellespont; *P. Lectum*, *C. Baba*, formed by the extremity of *Mount Ida*, crowned by the altar of the twelve gods built by *Agamemnon*; and *Cane*, *C. Coloni*, opposite *Lesbos*, in *Æolis*.

Beyond the twofold division of *Mysia* above mentioned, certain portions of this province received particular designations: thus, the district bounded by the *Sinus Adramyttenus* on the south, and northward to *Lampsæus*, was called *Troas*; the coast south of this, *Æolis*; and a small district south of *Temnus*, about the *Caicus* and its tributaries, *Teuthrania*.

The chief towns of *Mysia* lay along the coast, the interior being but thinly inhabited; the following are deserving of notice. *Cyzicus*, *Balkiz*, on the *Propontis*, was founded by a colony from *Miletus*; it stood a long siege against *Mithridates*; its harbour was excellent, and from the beauty of its situation, it became a fashionable place of resort to the Romans. *Lampsæus*, *Lamsaki*, on the Hellespont, founded by a colony from *Phocæa*, was celebrated for its wine, and as the original seat of the worship of *Priapus*. *Abydos*, *Aidos*, stood on the narrowest point of the strait opposite *Sestos*; it had an excellent harbour; at this spot *Xerxes* threw his bridge of boats across the Hellespont; the town is also famous for its heroic resistance to *Philip II.* of *Macedon*. Midway between *Abydos* and the promontory of *Rhœteum* lay *Dardānus*, with a district named after it *Dardania*; whence the straits have derived their modern appellation, the *Dardanelles*. Westward of this, towards the *Portus Achæorum*, the remains of the Mound of *Ajax* are still visible. *Sigeum* was founded by *Mitylenæans*, on the promontory of the same name, near the mouth of the *Simois*: it was destroyed by the *Ilions* after the fall of the *Persian* kingdom. In the plain near it stood the burial-place of *Achilles*, *Achillæum*, where *Alexander* and *Caracalla* celebrated games in honour of the hero. To the south of *Rhœteum*, on the banks of the *Simois*, and about four miles and a half from the Hellespont, stood the far-famed *Ilium*; its position is probably identical with the spot now called *Bunarbaschi*, but no remains are to be found. It is necessary to distinguish from the *Ilium* of historical times, *Ilium Novum*, which lay about three miles to the northward; this rose into importance in the *Macedonian* era, and was patronized by the Romans, who esteemed it the original *Troja*. The old town is supposed to have stood on the right bank of the *Simois*, with its citadel, *Pergamum*, on the other bank, between the *Simois* and *Scamander*. *Thymbra* probably stood half a mile further down the stream. *Alexandria Troas*, *Eskistamboul*, on the sea coast, nearly opposite *Tenedos*, was built by *Antigonus* at the command of *Alexander*, and rose to great eminence under the *Roman* emperors. Very few vestiges of the town exist, the stone having been removed to build *Constantinople*. On the southern coast of *Troas* lay, from *W.* to *E.*, *Assus*, later *Apollonia*, founded by *Æolians*, celebrated for its wheat and the peculiar stone (*lapis Assius*) used for coffins; *Gargara*, a colony of *Miletus*; at the foot of the highest point

of Ida; *Antandrus*, *Antandro*, at the foot of a hill on which its citadel was placed, founded by Pelasgians, and subsequently enlarged by Ætolians; and *Adramyttium*, *Adramyti*, at the mouth of the Caicus, with a good harbour.

The rich plain about the head of the Bay of Adramyttium was called the Plain of Thebe, after the Homeric town of that name, which lay about seven miles to the north-east of Adramyttium. To distinguish it from other towns of the same name, it was called Hypoplacia, from the hill Placus: the inhabitants of the city and plain are called Cilicians by Homer. Not far from Thebe stood Scæpsis, on the Æsepus, a Milesian colony, chiefly known as the spot where the works of Aristotle and Theophrastus were buried.

The district of Æolis extended from the head of the Sinus Adramytenus southwards, over the border of Mysia to the Hermus. On this they possessed (until they were deprived of Smyrna) twelve cities—viz. Atarneus, Cane, Pitane, Elæa, Grynium, Myrina, Cyme, Ægæ, Temnus, Neonteichos, Larissa, and Smyrna. Herodotus, in his enumeration of the confederate cities of Æolis, mentions Cilla, Notium, and Ægiroessa, in the place of Atarneus, Cane, and Elæa. Many of these towns were utterly destroyed by the violent earthquakes in the reigns of Tiberius and Trajan. The district of Teuthrania contained the important town of Pergamum,\* *Bergma*, the capital of the Attali, celebrated for the manufacture of parchment; the splendid library, collected by its kings, was transferred to Alexandria by Cleopatra.

The islands off the coast of Mysia attained great importance in ancient times, both from their proximity to the continent, and from their own resources. Lesbos, now called *Mytilene*, after its principal town, is divided from the mainland, by a channel six miles wide, and lies opposite the ranges of Gargarus and Ida, of which indeed it may be considered as a continuation. It is very rocky and irregular on its coast: but possesses spots abundantly fertile in corn, wine, and oil. The Pelasgians first settled here: subsequently the Æolians made it the head-quarters of their confederacy, and erected five cities—Methymna, destroyed by the Spartans in the Peloponnesian war, and Antissa, on the north-west coast; Eressus and Pyrrha, on the south-west; and Mytilene, on the east coast. Lesbos was the birthplace of Pittacus, Sappho, and Alcæus. Between Lesbos and the mainland lay three small islands called Arginûsæ—the scene of a naval contest between the Athenians and Spartans, B.C. 406. The island of Tenêdos, *Tenedos*, off the coast of Troas, resembles Lesbos in its features and character: but it was much smaller, and contained only one town, Tenedos, on the northern coast; it was of importance as a station for vessels to put into, passing to and fro from the Hellespont. North of Tenedos lay the small group, Calydna; and in the Propontis three islands, Proconnesus, *Marmara*, (whence the modern name of this sea is derived,) Ophiussa, and Alone.

4 LYDIA lies immediately to the S. of Mysia, separated from it by M. Temnus: towards the E. it was contiguous to Phrygia; towards the S. to Caria, M. Messogis forming the boundary. In the Persian era its limits were extended as far as the valley of the Mæander towards the south, so that it would include many towns properly belonging to Caria.

This province consists of two considerable valleys or water-basins—viz., that of the Hermus in the north, and that of the Cayster in the south, divided from each other by the high range of Tmolus. The course of the Hermus has been already described. The Cayster, *Kara Su*, or *Lesser Mindere*, rises on the southern declivities of Tmolus, and, in a south-westerly course, meanders through the rich alluvial plains that lie between Tmolus and Messogis, until it reaches the sea at Ephesus.

The central range of mountains is the Tmolus, *Boz-dağh*, which forms the watershed between these valleys; it commences on the border of Phrygia,

\* Pergamum is mentioned in the Book of Revelations as one of the seven churches of Asia; the others were, Ephesus, Smyrna, Thyatira, Sardis, Philadelphia, and Laodicea.

bends round to the north-west, and approaches the sea at Smyrna, where it received the name of Olympus. The southern ridge, Messôgis, *Musatag*, divides the valleys of the Cayster and Mæander: connecting with M. Tmolus at the head of the valley of the Cayster, it trends off towards the south-west, approaches the sea near Ephesus, where it was known as Mount Pactyas; then as Mount Mycæle forms a long promontory, terminating in the headland Trogilium, *Cape St. Marie*: the Messogis range reappears in the island of Samos, which is separated from the main land by a channel, not exceeding a mile in width, the scene of the Grecian victory over the Persians, B.C. 479. The same range may be traced across the valley of the Cayster in the high ground, which first, under the name Gallæsius, then as Mimas, runs out to the north-east, and forms the peninsula of Erythræ, and beyond that the island of Chios: it terminates on the main land with the promontories, Coryceum, *Koraka*, Argennum, *C. Blanc*, and Melæna, *Kara Burnu*. The promontory Myonessus, the scene of the naval fight between the Romans and Antiochus, is situated to the westward of Lebedus.

The names assigned to the districts of Lydia are indicative of the features of the country: thus we read of the Cilbiani Campi, in the upper valley of the Cayster; the Campus Caystrianus; the Campus Hyrcanus, in the upper valley of the Hermus; and the Hermæus Campus. The meadow of Asia, of which Homer speaks, lay in the upper valley of the Cayster, between the Tmolus and Messogis. The most important territorial division was that which lay along the coast, where the Ionians settled, and established a powerful confederacy of twelve cities—viz., Phocæa, Erythræ, Clazomenæ, Teos, Lebedus, Colophon, Ephesus, Priène, Myus, and Miletus, on the main land; and Samos and Chios, on the islands: it extended beyond the limits of Lydia into Caria.

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Phocæa, *Palæa Foggia*, the most northerly town in Ionia, was built on a tongue of land, on either side of which was a good harbour, protected by the island Bæceium in front. Smyrna, *Smyrna*, founded originally by a colony from Ephesus, but occupied afterwards by another from Cyme, lay near the innermost point of the Sinus Hermæus, where the clear stream of the Meles joined the sea. Originally a member of the Æolian confederacy, it came B.C. 688, into the hands of the Ionians: it was soon after destroyed, and for four centuries its inhabitants were scattered among the neighbouring towns, until Antigonus founded a new city on the other side of the bay, about two and a half miles from the old town, which became a flourishing seaport, and in the Roman era was deemed the most handsome of the Ionian cities. Clazomène, *Kelisman*, follows, twenty-five miles to the westward; the town was originally built by Colophonians on the main land, but afterwards removed to a small island, a quarter of a mile from the shore; by the orders of Alexander a mole was carried across the intervening channel. Erythræ, *Rître*, was situated on the west side of the peninsula formed by Mount Mimas: Alexander attempted to cut a canal across the neck of this peninsula, in order to facilitate communication between Smyrna and Ephesus. Outside the neck, southwards, stood Teos, *Bodrun*, the birthplace of Anacreon and Hecateus: its inhabitants, galled by the Persian yoke, mostly emigrated to Abdera. About fifteen miles lower down the coast was Lebedus, which fell through the removal of its inhabitants to Ephesus, by Lysimachus; it was famous for hot baths. Clarus, a small place, with a celebrated temple and shrine, sacred to Apollo, stood half-way between Lebedus and Colophon. The latter, was situated on the stream Hales, about two miles from the sea, with a harbour, Notium, whither the remainder of the inhabitants removed, when Lysimachus transferred the mass of its population to Ephesus—this was the town called New Colophon. Ephesus, *Ayasaluck*, was situated on the left bank of the Cayster, covering the declivities of the hills Priou and Coressus, and the plain intervening between them and the river. It was first occupied by the Leleges, then by Ionians, under Androclus: it rose to great eminence, and is described by Pliny as the 'light of Asia;' the

mouth of the Caystor formed its harbour, Panormus, and supplied the lagoons called Selenusiae, on the right bank, near which some suppose the temple of Diana to have stood. The chief towns in the interior were--Thyatira, *Ak Hissar*, on the river Lycus, and on the road between Pergamum and Sardis: Magnesia ad Sipylum, on the left bank of the Hermus, *Manisa*, the spot where Antiochus was defeated by Scipio, B.C. 190; Sardis, *Sart*, built on both sides of the Pactolus, in a plain at the foot of Mount Tmolus; it was the ancient capital of Lydia, and the residence of the Persian satraps; the houses were thatched, and in consequence the town was frequently destroyed by fire: it was not walled in until after Alexander's time; its citadel stood on a spur of Mount Tmolus. To the north of Sardis was the lake Colœ or Gygœa, artificially constructed to receive the superfluous waters of the Hermus, and so check the inundations to which the valley was liable. Beside the lake stood the necropolis of the kings of Lydia: several tumuli of enormous size are yet to be seen—one, called the tomb of Halyattes, having a circumference of half a mile. Philadelphia, *Allah Shehr*, lay at the foot of the Tmolus, on a small stream that fed the Cogamus: it suffered severely from the earthquakes in the reign of Tiberius.

The most important islands lying off the coast of Lydia are Chios and Samos. Chios, *Seio*, may be deemed a continuation of the peninsula of Erythrœ; a chain of hills runs from north to south, terminating in the promontories *Melœna* and *Phanœ*. The chief town, Chios, was situated on the eastern coast of the island, opposite the main land, from which it was about seven miles distant. Chios was celebrated for its vineyards, and was reputed to have produced the first *red* wine. Samos, *Samos*, lies in the direction east and west; the Ampelus range, a continuation of Messogis, traverses it, forming the promontories Posidium in the east, and Cantharium in the west. Its town, Samos, *Megalikora*, was situated opposite the promontory Trogillum, and was deemed one of the most beautiful towns of the ancient world; it was surrounded with a wall by Polycrates, and its harbour was defended from the prevailing winds by a mole a quarter of a mile\* long. Samos was about sixty miles in circumference; Chios exceeded one hundred. Icarus or Icaria, *Nikaria*, is evidently a further continuation of the same elevation; the range here received the name of Pramnus, and the eastern promontory, Dracanum, *Phanar*, with a town of the same name.

5 CARIA occupied the south-western corner of Asia Minor. On two sides it was bounded by sea—namely, by the Ægean on the W., and by the Mediterranean on the S. Towards the N. the Messogis ridge separated it from Lydia, and towards the E. the river Glaucus from Lydia, and the Cadmus M. from Phrygia.

The most important valley is that of the Mœander, *Mindere*, which, it will be observed, receives all the important streams of Caria from the south, leaving only one valley in the eastern part of the province, which opens towards the Mediterranean. The course of this river is remarkably tortuous, its bed lying on a broad alluvial plain, which it has perhaps formed, at all events has considerably extended by the copious deposits of sand brought down from the upper country. It receives on its right bank the Lethæus from M. Pactyas and the Gason, a small stream from Mycale; and on its left, the Marsyas, *Thsina*, a considerable stream that joined it opposite Tralles, the Harpasus, *Harpasu*, higher up, and the Orsinus. The water basin of the Mœander in Caria is headed by the ridges Cadmus and Sabbacum towards the east, on the other side of which follows the valley of the Calbis, (occasionally called Indus by Latin authors,) *Tavas*, which rises in Phrygia, and in a south-easterly course reaches the sea opposite Rhodes. The Glaucus is but a small stream; with the bay into which it flows, it formed the eastern boundary of Caria.

The mountain ranges are by no means uniform in their direction; Messogis in the north has been already noticed: south of the Mœander, two parallel ranges run towards the south-east, Latmus, which directs the course of the

Marsyas on its left bank, and Grion, which runs out to the westward, forming the peninsula in which Miletus is situated, and terminating in Prom. Posidium. A continuation of this, M. Phœnix, extends to the south, where it meets with a range running at right angles, M. Lide, in the neighbourhood of Pedæsus, which extends westward, forming the peninsula of Halicarnassus. In the east the ridges of Cadmus, Salbacum, and Dædala, offsets of the Taurus system, run from north to south. Besides the promontories already mentioned, Triopium, *C. Krio*, where the games in honour of Apollo were celebrated, and Cynossēma, *C. Cavaliere*, deserve notice.

The territorial divisions of Caria are not numerous; Ionia continued along the coast as far as the head of the Iasius Sinus, where it met the district occupied by the Dorian colonies. The chief seat of the Dorian confederacy, consisting originally of six cities, was Rhodes, where they possessed three cities, Ialysus, Camirus, and Lindus; on the main land they owned Cnidus and Halicarnassus; Cos, on the island of the same name, completed the number. The district bordering on the south coast opposite Rhodes was distinguished as Peræa, more properly Peræa Rhodiorum—i. e., the land *across* the sea from Rhodes.

The most important towns of Caria were situated on the coast; the first we meet with from the north is Priene, which, with Myus and Miletus, were the three Carian towns of the Ionian confederacy; it was situated at the foot of a spur of Mycale, with its citadel on the heights behind; originally on the sea, it had ceased, even in Strabo's time, to be considered a sea port, as the constant accession of land had pushed out the shore five miles. Myus was also once a seaport town, at the mouth of the Mæander; the bay, however, became choked up with soil, and left a stagnant lake, which bred such a plague of flies, that the inhabitants removed to Miletus. Miletus, *Palatia*, the most flourishing and enterprising of all the Ionian colonies, was situated at the southern entrance of the Latmian bay. In the time of its prosperity it carried on a lively trade with all parts of the Mediterranean and Euxine Seas, and it was also famous as a school of literature and science, as the abode of Thales and Anaximander, Cadmus and Hecateus. It consisted of an inner and outer city, with four harbours, protected in front by the islands Lade and Asteria; the site of the city is now covered with a pestilential swamp. Intimately connected with Miletus was the temple of Branchidæ, at the other extremity of the peninsula, about twenty miles distant. Iassus, *Asynkalesi*, lay further down the coast on a small island hard by the continent; it belonged to the Milesians, who made it a fishing station. Myndus, *Mendes*, lay somewhat to the north-west of Halicarnassus; it was fortified, and possessed a good harbour. Halicarnassus, *Boodroom*, a colony from Træzen, was built on rising ground close to the Sinus Ceramicus; the citadel which crowned the steep behind was deemed impregnable. Originally a member of the Dorian confederacy, it was rejected and became afterwards the seat of successive tyrannies. Alexander destroyed it; but it revived, and was a place of considerable importance in the Roman era. It was famed for the mausoleum, erected by Artemisia in honour of her husband, and as the birth-place of Herodotus and Dionysius. Cnidus, the metropolis of the Dorian confederacy, was situated partly on the promontory Triopium, partly on a small island connected by a mole with the main land. In the neighbourhood was the temple where the Dorian cities met for consultation. It is further known in history as the spot where Conon vanquished the Spartan Pisander, B.C. 394. Along the fertile coast of Peræa, which the Rhodians possessed until the time of the Persian conquest, lay the towns Physcus, the entrepôt for Rhodian commerce, and Caunus, founded by Cretans, and a place of considerable importance. In the interior the towns of importance were Magnesia ad Mæandrum, *Ink-bazar*, on a spur of Mount Messogis, said to have been founded from Magnesia in Thessaly, but in historical times in the possession of Miletus, well known as the residence of Themistocles: Tralles, *Guzelhissar*, in a similar position to the eastward, a place of large trade, and a favourite

resort of the wealthy Romans : higher up the valley of the Mæander, Mysa, at a spot called *Sultanhisar* : on the south side of the Mæander, Alabanda, in the valley of the Marsyas, celebrated for the luxurious habits of its inhabitants : further to the south Statoniceæ, *Eski-hissar*, erected by Antiochus Soter, in honour of his wife Statonice : it was much adorned by the Selenidæ, and became a free city under the Romans : Labranda, with its famed temple sacred to Zeus Stratius, between Alabanda and Mylasa, to which latter town it belonged : Mylasa, *Melasso*, the chief town in the interior ; it was situated in the valley between the ranges of Iatmus and Grion, ten miles from the sea ; an isolated marble rock, which afforded stone for the many splendid buildings with which Mylasa abounded, rises out of the plain close by the city.

The most important island lying off the coast of Caria is Rhodes, *Rhodes*, extending from N. to S., and evidently a continuation of the range of Cadmus. From its position, its fertility, and the excellence of its commercial regulations, it became a place of great trade. Its chief town, Rhodes, lay on the northern coast, opposite the main land ; it was built B.C. 408, in the form of an amphitheatre, and possessed two harbours, the entrance of which was spanned by the colossal statue of the Sun. The Dorians were settled in the towns Lindus, *Lindo*, and Camirus, *Camiro*, on the eastern coast, and in Ialysus, *Neocastro* on the northern. The island Cos, *Co*, in earlier times called Meropis, lies at the northern entrance of the Sinus Ceramicus, having its greatest length from E. to W. Its chief town, Cos, was situated on the eastern coast, with the celebrated temple of Æsculapius in its neighbourhood. The island has received a considerable increase from the accession of soil deposited by the currents. Besides these islands, many were scattered about between Icaria and Rhodes, of which we may mention Patmos, *Patmo*, which derives an interest from having been the abode of St. John, at the time that he wrote the Revelations ; Leros, *Lero*, tenanted by Miletus, opposite the Sinus Jasius ; Nisyros, off Prom. Triopium ; and Syme, in the Sinus Schonus.

6 LYCIA adjoins Caria to the E. Towards the N. it was contiguous to Phrygia and Pisidia ; towards the E. to Pamphylia ; towards the S. it projects into the Mediterranean Sea, which also flanks its south-eastern coast with the Mare Pamphylium and its south-western with the Glaucus Sinus. It is intersected by numerous offsets of the Taurus range, running for the most part from north to south. The main ridge of Taurus was considered to commence with Prom. Sacrum, *C. Kheledonía*, opposite the Insulæ Chelidonie ; rising immediately from the sea in regular elevations, whence it received the name Climax—i. e., *ladder*, it reached the height of ten thousand feet, terminating in the peaks Chimara, Hephæstis, and Olympus, the names of which indicate their volcanic origin. In the western part of the province M. Cragus bounds on the west the valley of the Xanthus ; it terminates in a cluster of headlands, now called *Yedi-Booron*, or *the seven capes* ; between the ridges of Cragus and Climax, M. Massycytus intervenes, crossing the country from the Xanthus to the Limyrus. The coast is rock-bound, and offers few spots of egress to the waters of the interior ; the only river of any importance is the Xanthus, *Etchenchay*, which skirts the base of Mount Cragus ; the Limyrus in the east is an inconsiderable stream.

The original name of this province was Milyas, and of the people Solymi ; these were driven back from the coast by the Termilæ, so that in historical times, the name Milyas was restricted to the district lying on the borders of Lycia and Pisidia, while the name of the people was preserved in the mountain Solyma. The chief towns were—Telmessus, *Makri*, on the Glaucus Sinus : Patara, *Patara*, at the mouth of the Xanthus, celebrated for the worship of Apollo ; it possessed an excellent harbour, now filled with sand,—and served as the port of Xanthus, the metropolis of Lycia, which lay about seven miles up the river of the same name. Xanthus was twice destroyed—viz., by the Persians, and by the Romans under Brutus : two miles east of Patara, Portus Phœnicus, *Kalamaki* ; then Antiphellus, *Andiflo*, originally the port of



Phellus, which lay in the interior; Andriæce, the port of Myra, *Myra*, a considerable town situated three miles from the coast: and Phaselis, *Tekrova*, situated on a tongue of land at the foot of Mount Climax; its position made it a favourite spot for pirates, on which account the town was destroyed by Servilius Isauricus.

7 Proceeding along the coast of the Mediterranean, we next enter upon PAMPHYLIA, which, strictly speaking, consisted only of a narrow strip of coast lying along the Pamphylicus Sinus, between Lycia and Cilicia. As the title of a Roman province, it included, down to the time of Constantine, Pisidia and Isauria. The boundaries of Pamphylia Proper to the E. and W. are uncertain; the river Melas appears the natural limit on the side of Cilicia; yet a district the other side of that was not unfrequently considered to belong to Pamphylia: again, Strabo fixes the commencement of Pamphylia towards the W., at Prom. Sacrum; Scylax, on the other hand, reckons Olbia and Perge among the cities of Lycia. We shall here consider it bounded on the E. by the Melas, and on the W. by M. Climax.

The Taurus range, in this province, recedes from the sea, and leaves a well-watered district, intersected with low ridges running towards the south. The chief streams are, the Catarrhactes, *Duden-su*, a violent mountain torrent in the western part of the province; the Cestrus, *Ak-su*, rising in Pisidia, and reaching the sea to the eastward of Catarrhactes; the Eurymedon, *Kapri-su*, famed for the victory of Cimon over the Persians, B.C. 466; and the Melas, *Menavgat-su*, on the borders of Cilicia.

The inhabitants of this district were, as their name implies, a mixed race of aborigines, Cilicians, and Greek settlers. The towns along the coast, from west to east, were Olbia, *Adalia*, on the innermost point of the Pamphylium Mare, probably identical with the town built by Attalus II., and called Attalia: Side, *Eski-Adalia*, an Æolian colony from Cyme, situated somewhat to the westward of the Melas; it stood on a low peninsula, and was much frequented by pirates: and in the interior—Perge, a short distance from the right bank of the Cestrus, about seven miles and a half from the sea, interesting as the spot where St. Paul entered Asia Minor, on his first apostolical visit; and Aspendus, an Argive colony on the Eurymedon, about the same distance from the sea. Both the Cestrus and the Eurymedon were in ancient times navigable as high as these towns.

8 CILICIA was bounded on the W. by the river Melas, and on the S. by the Mediterranean. The main ridge of Taurus separated it in the N. from Phrygia and Cappadocia, and the ranges of Amanus in the E. from Commagene and Syria. Within these limits lay two districts widely differing in character, and suggesting the division of this province into Cilicia Trachæa, or Aspera (i. e., the wild), and Cilicia Pediea, or Campestris (i. e., the level), which was also occasionally designated Cilicia Propria. The former district lay to the west, where the lateral ridges of Mount Taurus, under the names Cragus, Andricus, and Imbarus, push down close to the sea, in a south-westerly direction, terminating in a succession of cliffs and headlands, which made the navigation of this coast highly dangerous. The river Lamos may be considered the limit of Cilicia Aspera, a low, gravelly beach and open plains succeeding to the eastward of that river, with districts of remarkable beauty and fertility. The inhabitants of these districts differed, no less than the districts themselves, in character and occupations: the mountaineers, allied in race to the Pisidians and Isaurians, led a wild, piratical life, and for a long time bade defiance to the arms of Rome; the inhabitants of the plains, where many Greek settlements were formed, were devoted to agriculture and commerce; and reached a high state of civilization.

The province was bounded to the north by an almost unbroken wall of mountain, which, while it served as a protection from hostile incursions, was prejudicial to the climate, inasmuch as it screened Cilicia from the cooling breezes of the north, and left it to the influence of an almost tropical heat.

It was traversed by two passes, one leading from Labranda in Lycaonia to Seleucia in Cilicia Aspera, the other from Tyāna in Cappadocia to Tarsus, in Cilicia Campestris. The latter is the celebrated Portæ Ciliciæ—the Tauripylæ of Cicero—now *Golek Boghaz*, by which Xenophon and Alexander entered Cilicia. The entrance to this pass follows from the north side a tributary of the Sarus for some distance, which it forsakes for a lateral valley leading to a level summit, about four thousand feet above the sea; thence it follows the streams that flow into the Cydnus, the river of Tarsus. The pass on the northern side was so narrow as only to admit of the passage of eight horses abreast. Artificial defences were here erected, the remains of which are yet visible. On the side of Syria, there were two passes over the mountain of Amanus: the most southerly was situated between Baïæ and Antioch, and named Syriæ Portæ, *Pass of Beilan*; at its entrance, the mountain descended quite to the sea shore, and left a narrow passage\* for about a third part of a mile, which was defended by strong gates. The more northerly was named Amanicæ Portæ, and was situated between Ægæ and Baïæ: its position is somewhat uncertain; probably, however, the Cyclopean remains at *Temir Kapu*, on the western point of the plain of Issus, near the *Bay of Iskenderoon*, are identical with the gates by which the pass is said to have been guarded. This pass must be clearly distinguished from another over the main ridge of Amanus behind it, which lay at the head of the valley of the Pinarus, and led across to Commagene, and which has also been described as the Amanicæ Pylæ or Portæ. By this Darius crossed the Amanus in the rear of Alexander, and so brought on the battle of Issus.

The rivers of Cilicia Aspera rise on the southern declivities of Mount Taurus, and flow to the south-east; those in Cilicia Campestris, on the other hand, rise, for the most part, to the north of the Taurus range, and flow towards the south-west. They lie in the following order from W. to E.: the Calycadnus, *Ghiuk-su*, a considerable stream rising on the borders of Pamphylia, and joining the sea between the promontories Sarpedon and Zephyrium; the Lamos, *Lamos*, already described as forming the boundary between the two districts of Cilicia; the Cydnus, *Tersuschai*, remarkable for the coldness of its water, rising near the pass of the Portæ Ciliciæ, and flowing by Tarsus; the Sarus, *Seihun*, which, rising in Cappadocia among the ranges of Antitaurus, forces a passage through the Taurus, and, flowing through the rich Aleion Campus, joins the sea eastward of the Cydnus; the Pyramus, *Jyhun*, which rises in Cataonia, and passing through a narrow cleft of Taurus with tremendous violence, follows the course of M. Amanus, and originally discharged itself near the promontory of Megarsus, now, however, much to the eastward, near the ancient Ægæ.

The chief towns of Cilicia, from W. to E., were these: Coracesium, *Alaya*, situated on a precipitous headland, and one of the last haunts of the pirates; Selinus, *Selinty*, or Trajanopolis, at the foot of Mount Cragus, and surrounded by the sea; it derived its second name from the death of the Emperor Trajan having occurred there; Anemurium, on a promontory of the same name; Seleucia Trachæa, *Selef-kieh*, on the Calycadnus, founded by Seleucus Nicator, and in the Roman era the most flourishing town of these parts, about nine miles from the sea; Coryæus, *Korykos*, on the coast midway between the rivers Calycadnus and Lamos; about two miles distant was the celebrated Corycian cave, a deep, rocky ravine, with a cave at the furthest extremity: in Cilicia Campestris—Soli, later called Pompeiopolis, as being the town where Pompey confined the Pirates,—with an excellent harbour; it was reputed to be a colony from Argos, and attained great prosperity: Tarsus, *Tersooos*, the capital of Cilicia, situated on the Cydnus, about twelve miles from its mouth, in a fertile and beautiful plain; it was made a Roman

\* In this passage were the Portæ Ciliciæ et Syriæ, mentioned in Xenophon's *Anabasis*, l. 4: between which flowed the Cersus, *Merkez-su*.

city by one of the early emperors, and attained celebrity as a place of literature: it is further interesting as the birthplace of St. Paul, and the burial-place of Julian the Apostate. Eastward of the Cydnus the shore runs very low, and is interspersed with lagunes. The Aëlian Plain stretches inward from this between the rivers Pyramus and Sarus. Mallus was situated at the old mouth of the Pyramus, at the entrance of the Sinus Issicus; at the head of this bay, the remains of Nicopolis and Castabala are visible near each other; and on the eastern coast of it was Issus, on the right bank of the small river Pinärus—the scene of contest between Alexander the Great and Darius, B.C. 333. On the road between Tarsus and Issus lay two towns of importance—Adäna, *Adanah*, on the Sarus; and Mopsuestia, *Messis*, on the Pyramus.

9. CAPPADOCIA, with ARMENIA MINOR.—Before the Persian era, all the provinces lying between the Euphrates and the Halys, and between the Euxine Sea and the Taurus range, were designated by the general name, Cappadocia. A division was then established, the northern district bordering on the Euxine receiving the title Cappadocia ad Pontum—the southern resting on the Taurus range, Cappadocia ad Taurum. Subsequently, the former lost altogether the name of Cappadocia, which was applied solely to the southern district until the time of Tiberius, who assigned to the province of Cappadocia its original extent. Cappadocia Proper, which we here treat as distinct from Pontus, was bounded on the S. by the Taurus, and on the E. by the Euphrates; towards the W., an imaginary line running in the meridian of the Tatta Iacus separated it from Ilyæonia; towards the N. it was contiguous to Galatia and Pontus. It is said to have derived its name from the Cappadox, a tributary of the Halys.

Cappadocia consists of two distinct regions, separated by the range of Antitaurus, running from south-east to north-west. The westerly of these contains the highest ground of Asia Minor, extensive grassy uplands, broken by ravines, and interspersed with lofty mountains, with the streams flowing into the Halys, and seeking generally a northern direction: while the easterly assimilates in character and productions to the provinces of Central Asia, the streams flowing towards the south-east, and belonging to the water-basin of the Euphrates. The former was adapted for sheep; and its inhabitants, the progenitors of the *Turkomans*, partook of the nomad character: the latter offered many valleys and plains, adapted for agriculture and the growth of fruits. Antitaurus forms the water-shed between the Halys and the Euphrates; it culminates in the celebrated Mount Argæus, *Ardshisch Tagh*, whence (as it was currently believed) the Euxine and the Mediterranean Seas were visible. Besides this, it sends out other offsets hardly inferior in height, which have not received specific names in classic writers. Most of these mountains betray signs of volcanic agency; the numerous caves, formerly the asylum of persecuted Christians, and even now harbouring a troglodyte population, form a distinguishing feature in this district. The only river of importance is the Halys, which flows through the upper portion of the province in a wide and fertile valley, receiving numerous tributaries, one of which, rising in Mount Argæus, is known as the Melas, *Kara-su*. This must be distinguished from the tributary to the Euphrates of the same name, which rises on the eastern declivities of Antitaurus, and flows through the fertile district designated after it Melitene. From the same lofty region issue the head waters of the Cilician rivers Sarus and Pyramus. In the western districts, the waters find no outlet, but collect in lakes, of which the Tatta Iacus, *Great Salt Lake*, is the most remarkable for size and for the briny qualities of its water: it is situated in a plain, and surrounded by marshes.

The territorial divisions are as follows: in Cappadocia west of Antitaurus,—Tyanitis, in the south-west, about the town Tyanæ; Garsauria, northward to the Tatta Iacus; Chammamene, in the north-west; Cilicia, about the M. Argæus; and southward of it, Bagadania: in Cappadocia east of Antitaurus—Melitene, containing the valleys of the Melas and

its tributaries down to its confluence with the Euphrates, and Cataonia to the southward, bordering on Cilicia.

The chief towns were—Mocissus, *Mujur*, in the valley of the Halys; Mazaca, *Kaiseriye*, the capital, situated on the north side of Argæus, and on the banks of the small stream Melas; it was enlarged by Tiberius, and afterwards called Cæsarea, whence its modern name; south of Mazaca, Cybistra, the military station of Cicero in the Parthian war, and Nora, *Zinzibar*, the stronghold of Eumenes; in the south, Tyîna or Dana, *Kiz Hisar*, on the route from the north-west to the Portæ Ciliciæ, celebrated as the birthplace of Apollonius, with a remarkable spring in its neighbourhood. In Cataonia there were no towns in existence so late as Strabo's time, but only mountain fortresses; the chief town in later times was Comana, surnamed Aurea, at the foot of Antitaurus, remarkable for a temple and oracle. In Melitene, a town of the same name, near the confluence of the Melas with the Euphrates, now *Malatiyeh*, rose to considerable importance under Trajan, and became ultimately the capital of Armenia Secunda.

The mountainous district of Armenia Minor was generally considered as belonging to Cappadocia, and as such was incorporated in the Roman province of that name. It lay between Antitaurus and the Euphrates, separated from Pontus in the N. by the Paryadres range, and contiguous to Melitene in the S. Occasionally the districts of Melitene and Cataonia were included in Armenia Minor. After the Roman conquest of Mithridates, it was handed over as a present from one person to the other, and was not finally united to Cappadocia until the time of Trajan. In the upper valley of the Iyæus, which fell within the limits of Armenia Minor, stood the city Nicopolis, near *Devriki*, on the spot where Pompey conquered Mithridates.

TO LYCAONIA AND ISAURIA.—Lycaonia, during the Roman era, consisted of a large extent of table-land to the west of Cappadocia, having Iconium as its centre, and extending westward to Phrygia. Originally the name was assigned to a more easterly district, commencing near Iconium, (which then fell into Phrygia,) and including the lower parts of Cappadocia and Cataonia. In character, Lycaonia resembled the west of Cappadocia, though surpassing it in flatness: there are no hills or rivers of importance, but a succession of plains, with occasional lakes, the waters of which are strongly impregnated with salt.

The chief town was Iconium, *Koniye*, styled by Pliny, 'urbs celebrima:' it lay on the great route from the west to Syria, through the Portæ Ciliciæ, and attained considerable prosperity. Iacodiæna Combusta, *Iadik*, lay on the same route, somewhat to the north-east of Iconium; its name would suggest the existence of volcanoes in the neighbourhood; no traces of them, however, have been discovered, and it has been suggested, that the title Combusta arises from its having been burnt down by accidental fire. Numerous wealthy towns lay in the southern portion of Lycaonia, as Derbe, at one time the residence of an independent prince, Laranda, *Karaman*, and Lystra, situated nearer Iconium: the first and last are associated with the history of St. Paul's travels.

ISAURIA was a strip of wild mountain land between Lycaonia and Pisidia, with which the ancients were little acquainted, in consequence of the wild habits of its inhabitants. The Isaurians were attacked by Servilius, surnamed Isauricus, and also by Pompey, by whom they were not so much subdued as confined to their mountain fastnesses. Politically speaking, the Isaurians were more connected with the inhabitants of Cilicia than with the Lycaonians; in geographical position they belong rather to the latter. The chief and only important town in this district was Isaura, which suffered severely on two occasions—viz., when burnt down by Perdiccas, and afterwards when destroyed by Servilius.

II PISIDIA, lay to the N. of Pamphylia, among the ridges of Mount Taurus. Its boundaries are very uncertain: towards the N. and W., it was contiguous to Phrygia; towards the S., to Lycia and Pamphylia; and towards

the E., to Isauria. It extended, according to some accounts, into Phrygia Paroreia, so as to include Antioch; Cabalia and Milyas were reckoned sometimes with it, sometimes with Lycia and Caria.

This province is for the most part mountainous: towards the N., however, it assimilates in character to the plain of Phrygia. Here the waters collect in lakes, of which the two largest were named Caralitia, *Beysher*, and Trogitis, *Egyerdis*: in the S. it was watered by the upper courses of the Cestrus, the Eurymedon, and the other rivers which crossed Pamphylia to the Mediterranean Sea. The only territorial divisions in this province were Milyas and Cabalia, both lying in the south-western angle. It is impossible to fix the limits of these with any precision: Milyas seems at one time to have included the southern portion of Phrygia; then to have been applied to the district between Termessus and Sagalassus; and, lastly, to the border land of Lycia and Pisidia. Cabalia lay to the westward on the border of Caria, with which it was occasionally reckoned, about the course of the river Calbis.

The chief towns in Pisidia were—Antioch, *Galabat*, in a plain of the Paroreia, founded, it is said, by colonists from Magnesia, and visited by St. Paul: Sagalassus, *Aglason*, near the source of the Cestrus, of Lacedæmonian origin; its citadel, situated on a precipitous rock, offered a stout resistance to Alexander's army: Cremna, *Germe*, south of Sagalassus, also remarkable for its strong position: Selge, on the Eurymedon, which claimed Sparta as its parent state, and certainly showed a martial spirit worthy of such descent: its inhabitants maintained their independency until a very late period. In Cabalia there were four cities, forming a confederacy, named after the principal member of it, the Cibyrate Tetrapolis, which existed until about 80, B.C.:—viz., Cibyra, a Lydian colony, near the banks of the Calbis; its inhabitants were skilled in working iron: Cenoanda, Balbura, and Bubon, which lay more to the south, and never attained any great importance.

12 PHRYGIA (in the limited sense which the name received under the Romans) was bounded on the N. by the Sangarius, and a branch of the Mysian Olympus, and on the S. by M. Taurus; on the W., where it joined Mysia, Lydia, and Caria; and on the E., where it touched Galatia and Lycæonia, it had no natural boundary.

The aspect of this province is varied: its general character is mountainous, but occasionally extensive plains occur. The range of the Mysian Olympus traverses the northern border, and terminates in M. Dindymus on the confines of Galatia: another Dindymus, in the western part of the province, contained the sources of the Hermus: in the south, offsets from the ranges of Cadmus and Taurus enter in various directions, and gradually decline towards the central plateau. Phrygia contained the head-waters of most of the rivers flowing into the Ægean Sea. The Mæander rises in a limestone rock called Auloerène, behind Celænæ; it unites with the torrent Marsyas, (the Cataract of Herodotus,) in a small lake, in which both the streams disappear by a subterranean passage, emerging again by different channels, and re-uniting near Apamæa. The Mæander thence flows towards the south-west, receiving on the borders of Lycia another tributary, the Lycus, *Tchoruk Su*, which rises on the declivities of Cadmus. The small stream Obrimas, *Sandukli Chai*, (?) is supposed to have joined the Mæander near Celænæ. The Hermus rises in the heights of M. Dindymus, and flows to the south-west; on the same range rise also the Mysian Rhyndacus and the Thymbres, a tributary of the Sangarius, with which it united on the borders of Bithynia; it is probably the same river which was afterwards called Bathys. The Alander, another tributary of the Sangarius, rises in central Phrygia, and flows towards the border of Galatia. There were numerous lakes in Phrygia strongly impregnated with salt: that which was called Anau, lay to the south of the valley of the Mæander, between Colossæ and Celænæ: it is probably identical with the lake Ascania, which Alexander passed by.

This province abounded more than any other with the effects of volcanic agency. We have already mentioned the extensive burnt plain, Katakekaumene, on the borders of Lydia, which produced a superior quality of vine. Besides this, the numerous caves with mephitic exhalations, the subterranean passages, in which the rivers occasionally disappear, and the frequent incrustations of lava, are attributable to a similar cause. It was also visited by most violent earthquakes in the reign of Tiberius, which overthrew the principal cities, and ruined the prosperity of the province.

Phrygia was divided into four districts—Epictetus, (i. e., the added,) in the north, so called because it was recovered from the Bithynians, and adjoined to the province to which it before belonged; Salutaris, (i. e., the healthy,) in the centre; Pacatiana, on the western border; and Paorea, in the south, on the borders of Pisidia and Lyaconia. The chief towns were:—in Phrygia Epictetus, Dorylaeum, *Eskishehr*, on the Thymbres, on the high road from Byzantium to Syria; and Cotyæum, *Kutaya*, higher up the course of the same river. In Phrygia Salutaris, Synnada, celebrated for its marble quarries; Ipsus, an unimportant place in itself, the scene of the contest between Antigonus and the generals of Alexander, B.C. 301; Celænæ, *Den-nair*, situated not far from the sources of the Mæander and the Marsyas, which both skirted the town, and united just below it; the citadel of Celænæ, situated on a precipitous rock, was almost impregnable; it sank under the Syrian dynasty, and its inhabitants were removed by Antiochus Soter to a city which he built a little to the west, Apamæa Cibôtus, which became one of the most important towns of Asia Minor: about thirty miles to the west of Apamæa stood Peltæ, on the Mæander, and in the centre of an extensive plain, Campus Peltæus, *Balkan-Ovah*: it was celebrated for its dyed wool. In Phrygia Pacatiana, Colossæ, near *Chonos*, on the river Lycus, which is said to have disappeared into the earth, near the town; in the Persian era it was a town of much importance; it sank under the Syrian kings by the foundation of Laodiceæ and Hierapölis: but it derives some interest from the existence of a Christian church in apostolic times, to which St. Paul addressed an Epistle; out of its ruins the town of Chonæ was built, on the site of the modern *Chonos*. Laodiceæ, *Eski-hissar*, surnamed ad Lyeum, after the river on which it stood, on the border of Caria, built by Antiochus Deos, and named after his wife Laodice: it rose to such eminence that it became the capital of the Roman province Pacatiana: much of its wealth was derived from the glossy black wool produced in the neighbourhood: it suffered considerably from earthquakes: a little to the north, and on the other side of the valley of the Mæander, Hierapölis, *Pambook*, probably a Grecian town; it was also remarkable for its wool, and for the numerous hot springs and mephitic exhalations in the neighbourhood: in Phrygia Paorea, Thymbrium, to the south-east of Synnada, and Apollonia, formerly Mordiaum, celebrated for quinces, on the border of Pisidia.

13 GALATIA, or GALLO-GRÆCIA, originally a part of Phrygia, owes its existence as a separate province to the immigration of a Celtic tribe, the Galatæ. The original seat of this people lay between the Danube and the Alps. Marching eastward, after the dismemberment of Alexander's kingdom, they crossed the Hellespont, B.C. 278, and having gained a footing in Asia Minor by serving in the army of Nicomedes I., king of Bithynia, they finally settled down in the district named after them.

Galatia was contiguous to Bithynia and Paphlagonia on the N., to Pontus and Cappadocia on the E., to Lyaconia and Phrygia on the S. and to Phrygia and Bithynia on the W. In the northern parts it is wild and mountainous; in the south it partakes of the general character of central Asia Minor, consisting of high pasture lands, undulating and intersected with shallow ravines. The chief range of mountains, Olympus, *Ala-dagh*, lay on the borders of Bithynia, extending from east to west; in its defiles Manlius defeated the Tolistobogi. Lateral ridges, enclosing the various

tributaries of the Sangarius, extend towards the south as far as Ancÿra: the lofty M. Magäba, *Kurg-dagh*, in the neighbourhood of that place, was the scene of a contest between the Romans and Galatians. The range of Olgassys, *Alkuz*, on the borders of Paphlagonia, in the north, and of Adoreus, *Elmah-dagh*, on the borders of Lycaonia, in the south, are the only other ranges deserving of notice. The most important river in Galatia is the Halys, which flows through the centre of the province in a broad and sinuous course, bending round from the westerly direction it had hitherto preserved, to follow the north-easterly direction of the Olympus and Olgassys chains. The western part of the province is watered by the tributaries of the Sangarius, *Sakkariyeh*, flowing towards the north-west.

The Galatæ were divided into three tribes: the Tolistobogi, who occupied the valleys of the Sangarius; the Tectosäges, who lived in the centre of the province about the Halys; and the Troemi, to the east of them, towards the border of Pontus. There were but few towns of any importance. Ancÿra, *Angora*, the capital of the Tectosages, situated in a high plain to the north of M. Magäba, owed its prosperity in ancient as in modern times, partly to the superiority of the wool produced in the neighbourhood, partly to its central position on the road from Byzantium to the east. Pessinus, the capital of the Tolistobogi, was situated at the foot of M. Dindymus, and is only celebrated for the worship of Cybele, who possessed a famous temple on a spur of that hill. To the same tribe belonged the town of Gordium, on the Sangarius, an old residence of the Phrygian kings, chiefly known by the famous Gordian knot, on which the sovereignty of Asia was thought to depend; under the Romans it received the name of Juliopolis. The capital of the Troemi was Tavium, ruins at *Boghaz-Kieu*, to the east of the Halys, remarkable for a colossal statue of Jupiter, and a temple, with an asylum, sacred to him.

14 BITHYNIA, to the north-west of Galatia, lay along the Propontis and the Euxine Sea, between the rivers Rhyndacus on the W. separating it from Mysia, and the Parthenius on the E. separating it from Paphlagonia. These boundaries give the greatest extent to the province under the Roman power; originally, the Sangarius seems to have been its eastern limit; at a later period, Xenophon extends it to Heraclea. This province, the residence, in early times, of the Bebryces, Caucones, and Mygdones, was afterwards occupied by Thracian tribes, who emigrated here from Europe. Of these, the Thyni held the coast from the Sangarius westward to Chalcëdon; the Bithÿni lived in the south; while a tribe, unconnected in race with the Thyni—the Mariandÿni—held the coast between the Sangarius and Parthenius rivers.

Bithynia, though mountainous, is rich and fertile. In the interior there are numerous plains, adapted for sheep-feeding. Towards the sea-coast, the mountains, which in their upper regions are clothed with magnificent forests, open into sheltered valleys, where the vine, the fig, and all sorts of grain, were cultivated. The chief range of mountains is the Olympus, *Cheshish-tagh*, (a distinct range from that already mentioned in the description of Galatia,) which commences on the border of Mysia, and traverses the province with several lateral ridges, all preserving a direction parallel to the Euxine. One of these ridges, M. Arganthonius, forms the high ground between the Cïanus Sinus and the Astacenus Sinus. Of the rivers, the Sangarius and the Rhyndacus have been already mentioned. The Parthenius, *Barlan-su*, takes its rise in the Paphlagonian mountain Olgassys, and after no great length of course, joins the Euxine to the west of Amastus. The sea-coast of the Propontis is irregular, and from this circumstance offers numerous advantageous sites for towns. Two bays, Sinus Astacenus, *Gulf of Ismid*, and Sinus Cïanus, penetrate a considerable distance into the interior; the latter is connected with a lake, *Ascania, Lake of Isnik*, which has its extension in the same direction as the bay.

The important towns of Bithynia were Nicomedia, *Ismid*, the capital of Bithynia, on the Sinus Astacenus; it was built by Nicomedes I., and peopled with the inhabitants of the neighbouring town, *Astæus*, or *Olbia*, an ancient colony of the Megarians, which had been overthrown by Lysimachus; it attained a high state of prosperity, and was a favourite resort of the later Roman emperors; it is further interesting as the birthplace of Arrian, and the latest abode of Hannibal, who was buried at *Libyssa*, *Harakah*, on the northern shore of the Sinus Astacenus: *Chalcædon*, *Kady-Kieu*, on the same bay, near the entrance of the Thracian Bosphorus, a colony from Megara—an important and flourishing town, commanding the entrance to the Euxine, and affording a ready transit to Europe, and hence selected as the fleet station by the Persians in their wars against Greece: a little higher up the coast, *Chrysopolis*, on the site of the modern *Scutari*; the name is said to have been derived from the circumstance of the Persians keeping their treasury there: *Heraclæa Pontica*, *Erekli*, the only town of importance on the Euxine Sea in this province, a colony from Megaris, situated at the mouth of the Lycus, in the district of the Maryandini; it reached its highest prosperity under the tyrant Dionysius, but sank under the Bithynian kings, and was finally destroyed by the Roman general Cotta: Prusa ad Olympum, *Brusa*, at the foot of Olympus, the residence of Prusias: *Nicæa*, *Isnik*, at the eastern extremity of Lake Ascania, founded by Antigonos, with the name *Antigonia*, which was afterwards changed to *Nicæa* by Lysimachus, after his wife's name, *Nice*; before the foundation of Nicomedia, it ranked as capital of Bithynia; it derives, however, its chief interest from the general council held here, A.D. 325.

At the mouth of the Thracian Bosphorus, in the Euxine, two rocks—*Cyanci Scopuli*—rendered the entrance to that sea dangerous. The ancients, as usual, invested these islands with imaginary horrors. It was thought that they shifted their position (whence the name *Planetæ*), and that they closed upon and destroyed vessels (whence the name *Symplegades*). The rocks are now called *Urek-jaki*; a passage of about two miles' breadth intervenes between them.

15 PAPHLAGONIA adjoined Bithynia to the E., occupying the coast of the Euxine from the river Parthenius to the Halys, and extending inland to Mount Olympus and the borders of Galatia. The name is supposed to be derived from Shemitic words signifying 'the point of division,' the Euxine Sea being, as it were, divided by the projection of the coast, near Sinöpe, on the one side, and the Tauric Chersonese on the other. The general character of this province is mountainous, but fertile. Towards the sea are spreading plains, in which the olive and the other fruits of Asia Minor flourish. The interior is broken up by ranges of well-wooded hills rising to the height of about two thousand feet above the sea, and terminating in the usual high pasture grounds. The ranges of hills, and consequently the river courses, preserve a direction more or less parallel to the sea. The chief range received the name *Olgassys*, *Alkuz*; the minor ridges were not known by any specific name, with the exception of *Cytörus*, near the coast, celebrated for the growth of the box-tree. In the interior, there are frequent remains of copper-mines.

The rivers of this province are mostly tributaries of the Halys. This river forms the boundary on the side of Pontus, flowing for the most part in a deep stream between precipitous banks, and admitting of an entrance to that province only at one point, through a gorge now named *Kara-Depeh*. Its tributaries are the *Amnius*, *Kara-su*, on whose banks Mithridates defeated the Romans; and the *Doros*, higher up the country. These rivers rise in *Olgassys*, and flow towards the east; other streams, from the western declivities of this range, flow in the opposite direction, and seek the *Parthenius* and *Billæus*.

The province was occupied by three distinct races: the Paphlagonians, a



Syrian tribe, who surpassed the rest in numbers and power; the Honēti, a Celtic tribe, dwelling on the sea coast, about the Parthenius, and deemed the progenitors of the Italian Venetians; and the Chalýbes, a Thracian tribe, who inhabited the mountains in the eastern part of the province, and were chiefly occupied in working the mines. The chief towns were—Sinūpe, *Sinub*, a famous colony from Miletus, situated on a peninsula, on either side of which was a port; it was the most important of all the Greek colonies on the Euxine, and itself the parent of not unimportant colonies. Under Mithridates Eupater it became the capital of the kingdom of Pontus, and was subsequently colonized by the Romans; it is further known as the native place of the Cynic philosopher, Diogenes. Pompeiopolis, *Tash Kupri*, on the Amnias, with mines in the neighbourhood; it was erected on the spot where Pompey and Mithridates engaged: Flaviopolis, *Zafaran-boli*, in the south-west, both ancient and modern names indicating the abundance of saffron in the neighbourhood; and Hadrianopolis, on the Billeus.

16 PONTUS, anciently called Cappadocia ad Pontum, lay along the coast of the Euxine from the Halys to the border of Colchis, the river Acampsis being generally regarded as its limit to the E., but sometimes the river Phasis; towards the S., it was contiguous to Cappadocia and Armenia Minor. In shape this province was an irregular triangle; in character, wild, mountainous, and unfruitful, with occasional plains and valleys admitting of cultivation. Two important mountain chains occur in this province: the Paryadres, *Kuttag*, which runs parallel to the sea coast in the northern district, sending out numerous spurs towards the sea; and the Scædises, or Scordiscus, in the south: the Teches, whence the ten thousand under Xenophon obtained their first glimpse of the Euxine, forms the connecting link between the two.

The only important rivers besides the Halys, which had both its source and its termination in Pontus, were the Iris, *Yeshil-Irmak*, with its tributary the Lyeus, *Kalei-hissar*, and the border stream, Acampsis, *Bitumi*. The Lyeus rises on the western declivities of Scædises, and flows to the north-west until it falls in with the Iris and the Scylax from the south-west; after their junction, the united stream was known as the Iris; the Acampsis rises in M. Teches, and follows the course of the Moschici Montes to the north-east, and finally to the north. It is a violent mountain torrent in its upper course, whence it received the names Boas and Lyeus—the former probably the indigenous, the latter the Greek appellation for such streams.

Pontus was tenanted by a variety of wild tribes, of different race and character. The most interesting of these were the Chalybes, or the Chaldæi, as Strabo calls them, who have been already noticed as living in parts of Paphlagonia; they were scattered about the Paryadres range, where they were employed in working iron ore, and also occupied the coast to the east of the Iris. After the termination of the kingdom of Pontus, the province was divided into three districts—Pontus Galaticus, on the western border, which was subjected to a tetrarch of Galatia; Polemoniæus, in the centre, so called from its governor, Polemo, son of Pharnaces; and Cappadocius, in the east, which belonged to Polemo during his lifetime, and afterwards became the property of Archelaus, king of Cappadocia.

The important towns of Pontus were—On the sea coast from west to east, Amisus, *Samsun*, a good port, founded by Milesians, and after its destruction by the Paphlagonian princes, restored by the Athenians; Mithridates occasionally resided there; it was taken by Lucullus, and thenceforward gradually sunk: Themiscyra, the old residence of the Amazons, on the Thermodon; it sunk, probably, in the Mithridatic war, as no mention of it is made during the Roman era: Pharnæa, *Kerasunt*, built by Pharnaces, grandfather of Mithridates, out of the spoils of Cotyora; the mines of the Chalybes were near it; it appears to have been called also Ceræsus, but is to be distinguished from the place of that name, whence the cherry was introduced to Europe, which lay

nearly twenty miles to the eastward; and never reached the same size or importance: Trapezus, *Trebisond*, a colony of Sinope, which rose to great importance under the Romans, and was constituted capital of the adjacent district by Trajan; it was the first friendly town which the ten thousand met with on their retreat. In the interior, Amasia, *Amasiyeh*, on the upper course of the Iris, situated in a mountain gorge, where that river forces its way through mountains: Cabira, on the Lycus, a royal residence of the kings of Pontus; Pompey enlarged it, and gave it the name Diospolis: Comāna Pontica, *Tokat*, on the Iris, famous for the worship of the goddess Anaitis, or Bellona, whose temple was served by six thousand priests, and endowed with great wealth: Zela, *Zilleh*, in the south-west part of the province, built on an artificial elevation between the rivers Iris and Seylax; Mithridates here conquered Priarius, and here also Cæsar gained that decisive victory over Pharnaces which he reported to the Roman people in the words 'Veni, vidi, vici:' and Sebastia, *Sivas*, quite in the south, on the banks of the Halys, a town which rose into eminence only under the later Roman emperors.

## CHAPTER III.

I. COLCHIS, IBERIA, AND ALBANIA. — II. ARMENIA. — III. MESOPOTAMIA.

IV. BABYLONIA. — V. ASSYRIA. — VI. PERSIS. — VII. SARMATIA.

VIII. SCYTHIA, SERICA, AND SINE. — IX. INDIA.

### I. *Colchis, Iberia, and Albania.*

FROM Asia Minor we proceed eastward to lands with which the Greek and Roman writers had a much less intimate acquaintance. The remainder of the continent was designated Asia Major, in contradistinction to the peninsula: but neither of these titles, as has already been observed, are used by classical writers. The Caucasus was the natural boundary of the Persian and Roman empires, and may likewise be regarded as the limit of the *Orbis veteribus notus* in this direction. The district intervening between the Euxine and Caspian Seas was divided into three provinces—Colchis, Iberia, and Albania; the first lying along the eastern coast of the Euxine; the last along the western coast of the Caspian, from the Cyrus northward; and Iberia between the two.

The general character of these provinces is wild and mountainous: but each possesses plains and valleys admirably adapted for cultivation, where the population congregated in towns and villages. Colchis produced flax, and its people were engaged in weaving: Iberia, oil and wine, in addition to grain of all sorts: while Albania abounded, in the southern districts, with rich pasture-lands and vineyards. The climate of these provinces was various: Colchis excessively hot in summer, and unhealthy; Albania and Iberia, mild and wholesome.

The political geography of these provinces is soon told: they were tenanted by a variety of independent tribes, differing widely in race, language, and degree of civilization. Colchis yielded a nominal submission to the supremacy of the Persians, and afterwards became part of the Pontic kingdom. It was presented by the Romans to Polemo, after the death of Mithridates, and finally became a tributary state to the Roman empire. Iberia yielded a similar submission, first to the Persians, afterwards to the Roman empire. Albania was occupied by twelve distinct tribes subject to one king, until the Persian empire gained its supremacy, from which it reverted, as the two former, to the Roman empire.

1 COLCHIS, *Mingrelia*, was bounded on the S. by the *Acampsis*, on the N. by *Caucasus*, on the E. by the *Moschici Montes*, and on the W. by the *Euxine*. The chief river was the *Phasis*, *Rion*, rising in the *Moschici Montes*, and flowing with a rapid and copious stream to the westward, until it joined the *Euxine*, near a town of the same name. It received various tributaries—the *Rhion*, *Glaucus*, &c. Besides this, a vast number of mountain torrents poured down from *Caucasus* to the *Black Sea*. *Colchis* is more famed in mythical than in historical geography. The name, indeed, occurs in no writer earlier than *Æschylus*; but the scene of the golden fleece is laid in this district, at a town named *Æa*, which does not appear in any subsequent account of the country, and which is probably altogether misplaced. The only places to be noticed are—*Pityus*, *Soukhoum*, a Grecian seaport town of considerable importance in the north of *Colchis*, which the Romans strongly fortified—*Dioscurias*, under the Romans named *Sebastopolis*, a Milesian colony, and a place of considerable commerce—*Cytava*, on the *Phasis*, and *Sarapana*, on the same river, near the border of *Iberia*.

2 *IBERIA*, *Georgia*, was bounded by the *Moschici Montes* on the W., *Caucasus* on the N., the river *Alazonius* on the E., and *Armenia* on the S. This mountain-girt land was accessible in only four points:—one pass followed the course of the *Phasis*, from *Colchis*; a second, the course of the *Cyrus*, from *Armenia*; a third led by the *Alazonius* to *Albania*; and a fourth, by the *Sarmatiæ*, *Caspia*, or *Caucasia* *Pylæ*, to the north. The chief river was the *Cyrus*, *Kur*, which rises in the western mountains, and flows in a south-easterly direction towards the *Caspian Sea*, receiving in *Iberia* two considerable tributaries—the *Cambyses*, *Fori*, and the *Alazonius*, or *Abas*, *Alazan*, which both rise in the *Caucasus*. The towns of importance were—*Harmozica*, on the *Cyrus*; *Mestleta* probably in the neighbourhood of *Tiflis*; and *Artanissa*, somewhat to the north of the last named.

3 *ALBANIA*, corresponding with the provinces *Daghestan* and *Shirvan*, lay along the *Caspian Sea*, from the *Cyrus* upwards to the *Ceraunian branch* of the *Caucasus*. It was watered by the tributaries of the *Cyrus*, as well as by numerous coast streams. A ridge of *Caucasus* penetrates the whole length of *Albania*, crossed in the neighbourhood of *Derbend* by a fortified pass, named *Pylæ Albanicæ*. Of the towns of *Albania* nothing is known beyond their names and positions—*Gætara* and *Albana* on the *Caspian*; *Osica*, at the confluence of the *Alazonius* and *Cyrus*; and *Chabale* near the *Albanian gates*.

## II. *Armenia*.

*ARMENIA* followed to the south of the three provinces just described, separated from *Albania* by the river *Cyrus*, and from *Iberia* and *Colchis* by the *Moschici Montes*: it stretched southwards to *M. Masius*, on the border of *Mesopotamia*, and to the border of *Assyria*: the *Euphrates* formed its western, and the *Araxes* its eastern boundary. This district is still called *Armenia*.

*Armenia* is the highest ground of western Asia: it consists of a complicated knot of mountain ranges, whence the various important systems of *Caucasus*, *Zagrus*, *Taurus*, and *Caspian*, diverge to the north, south, east, and west. The centre and cradle of all these is the high plateau\* of *Armenia*, a bleak and desolate region, intersected by various snow-capped and impassable ridges. The range of *Taurus*, on the eastern bank of the *Euphrates*, forks off into *M. Masius*, *Karajeh Dagh*, towards the south-east, and *M. Niphates*, (i. e. the snow mountain,) *Hatrasch Dagh*, towards the east. *Antitaurus*, in the north, likewise connects with two ranges, viz.; by *M. Capotes*, with the central *Abus*, and by the *Scædises* and *Paryadres*, with

\* The plain of *Moosh*, to the north of *Niphates*, has an elevation of four thousand feet above the level of the sea.

the lower limbs of Caucasus. In the eastern part of the province, these northern ranges verge towards the southern point of the Caspian Sea, where they unite with the continuation of Taurus and Niphates under the name of M. Caspius. The southern boundary of Armenia is irregular; from the eastern termination of M. Masius, on the border of Mesopotamia, it crossed the Tigris, and followed the course of the Gordyæi Montes, the *Koord* mountains, to the north-west, until it met the valley of the Centrites, which it followed to the south of lake *Van* and then fell into the line of the M. Caspius.

The streams of Armenia flow in all directions—the Euphrates to the south-west, the Tigris to the south-east, the Araxes to the east into the Caspian, and the Acampsis to the west into the Euxine. The Euphrates, divides in its upper course into two considerable streams: the northern, *Kara-su*, rises in the ranges of Scardises; the southern, which is the most important, *Marad-su*, in M. Abus. The latter branch is the Euphrates of Xenophon; it flows to the west, receiving the Teleboas, or Arsanius, from Niphates, and many other tributary streams. The Tigris, the Hiddekel of Scripture, rises on the southern declivities of Niphates, and receives in Armenia these three tributaries—the Nymphæus, river of *Meiaferikin*; the Nicephorius, stream of *Betlis*; and the Centrites, *Buhtan-chai*, flowing from the north-east, and joining the Tigris where it changes its course from east to south-east. The Tigris is a violent stream, running in a rocky bed, and hemmed in by the ranges of the Cardüchi Montes on the left, and M. Masius on the right bank. The Araxes, *Aras*, rises not far from the northern branch of the Euphrates: in its upper course it received the name of Phasis (the Phison of Scripture), under which title Xenophon describes it: flowing eastward it received the Harpäsus, *Arpa-chai*, somewhat to the north-west of Mount Ararat. The course of the Acampsis has already been noticed. Armenia contains several extensive lakes—*Arsissa*, *Van*, near the Tigris; *Lychnitis*, *Erivan*, to the north-east of Ararat, and *Thospites*, in the valley of *Diarbekr*.

Armenia was divided into numerous districts, the names of which may, in many cases, be identified with the modern appellations: for instance,—Chorzène, *Kars*; Cardüchi, *Koords*; Ossarène, *Erzeroum*. The district Sophene lay in the south-west, and with Acilisene formed a separate kingdom, under the Seleucids. Armenia, though so inaccessible and unfavourable to an invading army, appears to have fallen an easy prey to the dominant power, whatever that might be. It formed in turn part of the Assyrian, Median, Persian, Macedonian, and Syrian kingdoms: under Artaxias, B.C. 189, it became independent. Towards the termination of the first century of our era, it became a bone of contention between the Romans and Parthians. Trajan reduced it to the state of a Roman province, and it remained part of the Roman empire until A.D. 440, when it fell into the hands of the Persians.

Armenia contained few towns of any size; the population was scattered about in villages. Artaxäta, *Ardaschat*, the capital, was situated on the Araxes, to the east of Ararat: it was said to have been founded by the advice of Hannibal: its fortifications were strong: nevertheless it was several times conquered, and was burnt down by Corbulo. Tigranocerta, the later capital of Armenia, built by Tigranes, was situated in the south of the province: its position is uncertain: some have, without good reason, identified *Sert* with it: it is more probably far to the westward, on the site of Amida, *Diarbekr*, on the upper course of the Tigris, *Arsamosäta*, a strong fortress, lay in the plain of Sophene, between the valley of the Euphrates and the sources of the Tigris. *Artemita*, on the lake *Arsissa*, *Van*, and *Amida*, on the Tigris, were towns of a comparatively late date.

III. *Mesopotamia.*

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MESOPOTAMIA was the Greek translation of the native name, Aramnaharaim—the 'land between the rivers' Euphrates and Tigris. The title seems to have come into use about the time of the Seleucidæ, before which period the Greeks treated it either as a part of Syria or of Assyria. The boundary on the N. was M. Masius, separating it from Armenia, and on the S. the Median wall, separating it from Babylonia. It is now denominated *Algesira*.

With the exception of the border range of Masius, and a spur of the same, M. Singära, *Sindjar*, to the east of the Mygdonius, Mesopotamia was one extensive, unvaried plain, affording rich pastures to the north of the Chaböras, wherever there was sufficient irrigation, but to the south of that river degenerating into a mere sandy desert. It was devoid of wood, with the exception of the declivities of Masius, which supplied timber for the fleets said to have been built by Trajan and Severus in this province. The southern district cannot be better described than in the words of Xenophon, who calls it 'Arabia,' as being tenanted by a horde of Scenile Arabs: 'The land is on every side a plain as level as the sea, and full of wormwood; whatever other shrubs or reeds grow there have an aromatic smell, but no trees appear.' The rivers of Mesopotamia are, the Euphrates and Tigris, with the tributaries of the former, Chaboras and Belias. The Euphrates attains its greatest breadth at Thapsacus, where it is about 800 yards across; below that place it wears a deeper channel in the alluvial soil through which it flows, and suffers a diminution of its waters from the numerous artificial channels into which it is divided for the purposes of irrigation. The Chaboras, *Khabur*, the Araxes of Xenophon, has its sources in M. Masius; it flows towards the south, receiving the Mygdonius from the neighbourhood of Nisibis, and the Saocöras from Singära, and joins the Euphrates at Circesium. The Mascas mentioned by Xenophon is not a river, but an artificial channel of the Euphrates, drawn round so as to insulate the town Percöte.

The political history of Mesopotamia is much the same as that of Armenia: it formed a portion of the ruling powers of the world in their various eras—Assyrian, Median, Persian, Syrian, and Roman. It was divided into two districts, Orsoëne to the north-west of the *Chabur*, and Mygdonia to the east and south-east of that river. The chief towns were as follow: Edessa, or Callirhoe, *Orfa*, on the Scirtus, a tributary of the Belias—probably the 'Ur of the Chaldees' of Scripture; Batnæ, to the south-east of Edessa—Sarrug of Scripture; Carræ, Haran, or Charran, on the Belias, to the south of Edessa, where Crassus was defeated by the Parthians; Niccophorium, or Callinicum, at the junction of the Belias—it was built by Alexander's orders, and completed by Seleucus Nicator; Circesium, Karchemish, *Kerkesia*, at the junction of the Chaboras, a well-fortified town; Nisibis, otherwise Antiochus Mygdonia, *Nisibin*, on the Mygdonius, which ranked as the capital of Mygdonia, and was an important depôt of Eastern merchandize—it was three times destroyed by the Romans, and as often restored; Singära, in the centre of the country, near the hill of the same name—it was fortified by the Romans, who sent a colony there; Atræ, *Heddur*, in the southern district, not far from the Tigris; and Cænæ, on the Tigris, above the confluence of the great Zab. •

IV. *Babylonia.*

I BABYLONIA, or CHALDÆA, the Shinar of Scripture, commenced on the south side of the Median wall, and stretched thence to the Sinus Persicus. It was bounded on the E. by the Tigris, on the W. it occupied both banks of the Euphrates, and extended some short distance into the deserts of Arabia. It corresponds with the modern *Irak-Arabi*, as far as the bank of the Euphrates.

This province consists of an unbroken alluvial plain, sinking at certain

places into deep hollows where the waters collected in lakes and marshes, devoid of stone, and, with the exception of groves of palm and cypress trees, which were in ancient times abundantly cultivated, devoid also of wood. In this naturally monotonous country, the hand of man supplied various objects of interest: numerous artificial elevations, crowned with temples, broke the uniformity of the horizon; canals cut in every direction rendered the waters of the Euphrates and Tigris useful for irrigation, and regulated the periodical inundations of the former river, at the same time that they served as high roads of traffic, and contributed to the salubrity of the air; the absence of stone was compensated by an abundance of clay for bricks, and of numerous springs of naphtha, which supplied a powerful cement; and thus Babylonia was, in ancient times, (in strong contrast to its present appearance,) a land of cities and gardens, thickly populated, and abounding in all the necessaries of life. The Median wall, now called *Sudd Nimrud*, said to have been built by Semiramis, and to have had a height of 100 feet, a thickness of 20 feet, and a length of 60 miles, stretched across from Opis, on the Tigris, in a south-westerly direction, to the Euphrates, coming upon that river near the entrance of the first canal. The northern part of the province was intersected by four large canals, within a space of thirteen miles, in the neighbourhood of Seleucia; the largest of these was called Naarmalcha, or the *King's Canal*. There were also two large canals on the west side of the Euphrates: the Naarsäres, which struck off from the Euphrates near the Median wall, and ran nearly parallel to it, until it rejoined the united Tigris and Euphrates not far from the sea; and the Pallacöpas, which left the Euphrates below Babylon, and discharged the superfluous waters of that river into a large lake. The Euphrates and Tigris joined their streams in Mesopotamia, (above the present point of junction at *Korna*.) in the valley now occupied by the *Shat-al-Hic*. The united rivers received the name Pasitigris, *Shat-el-Arab*, and discharged themselves into the Persian Gulf, probably by two mouths, Ostium Occidentale, as Ptolemy calls it—the Euphrates of Nearchus—and the Ostium Orientale, or the Pasitigris.

The territorial divisions of Babylonia were, Messene, in the north, where the rivers approached each other; Chaldaea, in its restricted sense, on the right bank of the Euphrates, from Babylon to the sea; and a second Messene on the shore of the Persian Gulf. The capital was Babylon, or Babel, *Hillah*, built on both sides of the Euphrates, in the form of a quadrangle; the western half was the most ancient, and contains the ruins called *Birs Nimrud*. On the eastern side of the river, which was traversed by a bridge, was situated the palace of Nebuchadnezzar, with the celebrated hanging gardens. Babylon was taken by Cyrus, B.C. 538; Darius dismantled it of its walls; it sank finally through the erection of the towns Seleucia and Ctesiphon, so that in Pausanias' time only the walls remained. Seleucia, on the right bank of the Tigris, opposite Ctesiphon, and north of Babylon, was built by Seleucus Nicator, and soon became the most important place of trade in the country. It was ruined by the Romans, Trajan first having sacked it, and afterwards Verus. To the north of it, was Sitäce, *Eski Bagdad*, about a mile and a half from the Tigris; then Cunaxa, not far from the Euphrates, below the King's Canal, where Cyrus the Younger engaged with Artaxerxes, B.C. 401; Pirsaböra, *Anbar*, a large city near the Median wall, and at the entrance of the Naarsares Canal; Apamea, *Korna*, at the present junction of the Euphrates and Tigris; Terëdon—perhaps *Bassorah*—on the western branch of the Pasitigris, near the sea; Ampe, whither Darius transplanted the Milesians, not far from the mouth of the Tigris; and Alexandria, or Charax, built by Alexander at the mouth of the Tigris, and rebuilt by an Arabian prince, Spasines, after whom it was named in later times.

2 The Babylonian kingdom is said to have been founded about 2000 B.C., and existed down to the time of the Persian conquest, B.C. 538. The territorial extent of this kingdom was, however, confined to the neighbourhood of Babylon, until the conquests of Nabopolassar, 625—604. That sovereign aided

the Medes in the destruction of Nineveh, defeated the Egyptian monarch Pharaoh-Necho at Circesium, and established the Chaldæo-Babylonian kingdom over Mesopotamia, Phœnicia, Syria, and Israel. This was the era of the greatness of Babylon, and the date of the most wonderful erections in and about that city. After the death of his successor, Nebuchadnezzar, the kingdom sank; it received its deathblow (538) in the capture of Babylon by Cyrus. Thenceforward it formed part of the kingdom of Persia: in the division of Alexander's dominions, the old Babylonian kingdom fell to Seleucus, and formed part of the Syrian empire, until the advance of the Parthians.

### V. *Assyria.*

1 ASSYRIA, like Babylonia, is the title of a kingdom as well as of a province. As a province, it was bounded by the Tigris on the W.; M. Choatras, and its continuation, Zagrus, on the E.; the Carduchi Montes and Niphates on the N.; on the S. it was contiguous to Susiana. It was a long, narrow, mountain district, well watered by the tributaries of the Tigris, little wooded, but generally fertile, and abundant in asphalt and naphtha. It corresponds with the modern *Kurdistan*, and with the Ashur of Scripture.

The tributaries of the Tigris, which flow from the Zagrus M. towards the south-west are: the Lycus, or Zabäus, *Great Zab*, with its tributary, the Bumäduš, *Khasir*, on the banks of which Alexander defeated Darius; it joins the Tigris below Nineveh; the Caprus, *Little Zab*; the Physcus, or Tornadotus, *Odorneh*, which joins just above Opis; the Gyndes mentioned by Herodotus, probably a branch of the *Kerah*, or *Kara-su*: at the head of the valley of the Silla, was the pass over the Zagrus into Media, called *Pylæ Mediæ*.

Assyria was divided into a variety of districts, of which we shall only notice Adiabène, about the Lycus, and Aturia, about Nineveh. Both these names were occasionally applied to the whole province; they appear, however, not to have been strictly contemporaneous divisions, for Adiabene in later times included Aturia. The towns of Assyria were, the capital, Ninus, or Nineveh, *Nunia*, opposite *Mosul*, near the Mespylæ of Xenophon, on the left bank of the Tigris, above the junction of the Lycus: it was partially destroyed in the time of Sardanapalus, B.C. 817, and fully by Cyaxares the Mede, B.C. 606; the town never rose again, but there appears to have been a fort erected on its site by the Parthian princes: Ctesiphon, the second capital of Assyria, opposite Seleucia, the ruins of which two cities are now called *Al-modain*—it was the winter residence of the Parthian kings, and in Julian's time strongly fortified: Arbēla, *Arbil*, in Adiabene, between the Lycus and Caprus, the head-quarters of Darius before his engagement with Alexander: the battle is sometimes called the battle of Arbēla, but it actually took place at Gaugamēla, near the river Bumäduš: Larissä, the Resen of Scripture, ruins of *Nimrud*, near the junction of the Lycus—it was deserted at the time of the retreat of the ten thousand; Ecbatāna, *Amadiyeh*, on a tributary of the Zabäus; and Opis, at the junction of the Physcus, an old commercial town, which early disappeared. A district named Calachene, lying along the Tigris, to the north of Nineveh, is probably the same mentioned in Scripture under the name Halah, whither the ten tribes were transplanted; in the same neighbourhood, the river *Chabor*, may represent the Habor, if the passage in 2 Kings, xvii. be read, 'Habor the river of Gozan.' Habor is also identified with the Mesopotamian Chaboras, and with the hill Chaboras between Media and Assyria.

2 The kingdom of Assyria included in its greatest extent, Mesopotamia, Babylon, Media, and Persia. Shalmaneser, about 730, extended his conquests to the borders of Egypt. In the reign of Sennacherib it sunk, and it was finally overthrown B.C. 606 by the coalition of the Medes and Babylonians against it. It afterwards became part of the Persian empire, and shared its lot in the various revolutions which it underwent.

VI. *Persis*.

§ 1. Media. — 2. Median Empire, — 3. Susiana. — 4. Persis. — 5. Carmania. — 6. Parthia. — 7. Hyrcania. — 8. Aria. — 9. Drangiana. — 10. Gedrosia. — 11. Arachosia. — 12. Paropamisadae. — 13. Bactria. — 14. Sogdiana. — 15. Margiana. — 16. Persian Empire. — 17. Parthian and Bactrian Kingdoms. — 18. The later Persian Empire.

PERSIS is a name commonly applied in Ancient, as Persia in Modern Geography, to all the countries lying eastward of M. Zagrus to the river Indus. This use of the name is improper, because it is neither co-extensive with the province or with the kingdom of ancient Persia; it has, however, been adopted by geographers, and is therefore adhered to. It includes the provinces Susiana, Persis, Carmania, Gedrosia, Media, Hyrcania, Parthia, Aria, Arachosia, Bactria, Margiana, and Sogdiana. We will first describe the western provinces, Media, Susiana, and Persis.

1 MEDIA was bounded by the Araxes on the N., the Caspian Sea on the N.E., M. Zagrus on the W., and M. Charbanus, separating it from Susiana, on the S. It thus comprises the modern provinces, *Azerbijan* and *Ghilan*, with parts of *Irak-ajemi* and *Mazanderan*. It is generally a mountainous district, particularly towards the north, but eminently fertile; the plains and valleys of Atropatène—the Nisæi Campi, famous for its breed of horses—and the coast district of the Caspian Sea, were and are famous for all sorts of vegetable productions. The mountain ranges are irregular in their direction: M. Caspius and the Zagrus range in the west have already been mentioned: the former reaches its greatest elevation in M. Coronus, *Demucund*, on the border of Hyrcania; a lateral ridge of Zagrus, M. Jasonius, penetrates into the centre of the province. The chief rivers are—the Amardus, *Kizil-ozien*, perhaps the Gozan whither the Israelites were transplanted, which rises in the heights of Zagrus, and flows towards the north-east into the Caspian Sea; and the border-stream Araxes. The Cambyces and the Straton were small coast-streams; the former in the north-west of the province, the latter near Hyrcania. An extensive lake, named Spauta, now the *Lake of Urmia*, is situated in the north-west corner of Media: its waters are excessively salt and bitter.

Media was divided into two districts—Media Magna in the south, and Atropatène in the north-west, so called from Atropates, a native, who established an independent kingdom after Alexander's death. The chief towns were—Ecbatāna, called in Scripture Achmeta, *Hamadan*, in Media Magna, the ancient capital and treasury of Media, said to have been built by Dejoces, and surrounded by him with a sevenfold fortification: it was captured by Alexander, and afterwards by Seleucus and Antiochus; and so great a plunder was taken from it, that the Syrians coined four thousand talents out of the precious metals they found there; Ragæ, the Rages of Scripture, to the east of Ecbatana, near the Parthian frontier and the modern *Tehran*: it was reputed the largest city of Media; having been destroyed (perhaps by an earthquake), it was restored by Seleucus Nicator, with the name Euröpus; the district about it was called Ragiāna, and contained the celebrated Nisæan plains; Gaza, or Gazāca, in Atropatène, the summer residence of the Median kings; and Phraaspa or Vera, to the south-east, their winter quarters, the former to the south of the lake Spauta, and the latter at a greater distance to the south-east. The shores of the Caspian Sea were occupied by the Cadusii, or Gelæ, as far south as the Amardus.

2 MEDIA was the seat of an independent empire, from B.C. 708 to 558. This empire, at its greatest extent, reached westward to the Alps, and eastward over Persia, though its limits in this direction are not known. The period of its highest prosperity was under Phraortes, circ. B.C. 640. It was merged in the Persian kingdom by Cyrus, B.C. 558.

3 SUSIANA was an extensive plain to the S. of Media, between the Tigris on the W., and the Parachoathras (a continuation of Zagrus) on the E.;



towards the S. it was bounded by the Persian Gulf and the river Arosis: it corresponds with the modern *Khuzistan*. It was a fruitful district, but unhealthy on account of the heat; the coast was inaccessible through lagoons and marshes. The chief rivers, besides the Tigris, are—the Choaspes, *Karoon*, which rises in Parachothras, receives the Eulaeus, *Abzal*, near Susa, with the Hedyphon, and joins the Pasitigris not far below the junction of the Euphrates and Tigris: the waters of this river were celebrated for their purity: the Coprates, a tributary of the Pasitigris, and the Arosis, *Tah*, on the border of Persis. Of the districts into which this province was divided, we will mention Elymais, to the south-east of the Choaspes, from which the Scripture name Elam is applied to Persia; and Cissia, on the mid-course of the Choaspes, about Susa. The towns worthy of notice were—Susa, the Shushan of Scripture, ruins at *Shuster*, on the left bank of the Choaspes, the winter residence of the kings of Persia; it is said to have been founded by Tithonus, brother of Priam, and finished by his son, Memnon, whence it was called Memnonia; Seleucia, or Solöce, on the Hedyphon; and Azara, on the same river, with a celebrated temple of Diana; it is supposed to be the town mentioned 1 Macc. vi. 1, 2.

4 PERSIS, the metropolitan province of the Persian empire, lay along the gulf from the river Arosis on the W., to the Bagradas on the E.; towards the N. it extended up to the central plateau, and was separated from Parthia by a low offset of Parachothras. It corresponds with the modern province *Fars*. Little was known of it by the ancients except the north and west districts, which the expeditions of Alexander had somewhat opened. The route from Susiana to Persis crossed the Parachothras by a succession of difficult passes, commencing with the Portæ Susiade, and terminating with the Pylæ Persicæ, the latter situated to the south-west of Persepolis. The chief river, Araxes, *Bend-emir*, rises on the borders of Susiana, and flows towards the east; it receives the Medus, *Pulwar*, near Persepolis, and discharges itself into a large salt lake, now called *Bakhtegan*. The Cyrus, earlier Agradatas, flowed by Pasargadæ, on the eastern border. There are, besides these, numerous small rivers flowing into the Persian Gulf. This province is very unequal in climate and character: the northern desert district, called Paratacene, is liable to the extremes of cold and heat, and is only fit for sheep-feeding; the central district contains many spots famous for fertility, such as the plain of Persepolis, and the modern valley of *Shiraz*; the sea-coast is swampy and unhealthy. The chief towns were—Persepolis, north of the Araxes, destroyed by Alexander; the beautiful ruins are now called *Takht-i-Dschemschid*: and Pasargadæ, on the Cyrus, to the south-east of Persepolis, where Cyrus was buried; it is supposed by some, but without reason, to have been a suburb of Persepolis; its position is at present a matter of doubt.

5 CARMANIA, which still retains its ancient name in *Kerman*, bordered on the Persian Gulf from the river Bagrada in the W., to the promontory of Carpella in the E., and stretched inland to the borders of Parthia. The southern district was rich in grain, fruits, and precious metals. One district, named, *Nurmansher*, to the east of Persepolis, is still famous for its fertility; through this Alexander's route led on his return from India. On the other hand, the northern parts of the province adjoining the wilderness were barren, and only adapted for sheep-feeding. The only hill which received a specific name was M. Semiramidis, also called Strongylus, near the neck of the Persian Gulf. The chief towns were—Carmāna, *Kerman*, in the interior, possibly an emporium of eastern commerce in the most ancient times; and Harmuza, on the coast; the people retired thence to a neighbouring island, *Hormuz*, whence the straits are called. There are numerous islands at the entrance of the Persian Gulf.

6 PARTHIA, or Parthiene, now *Khorassan*, lay to the north of Carmania, between Media on the W., and Aria on the E.; towards the N., it was separated from Hyrcania by M. Caspius. It was a barren, sandy desert,

broken towards the northern frontier by the offsets of M. Caspius, and so little valued by the Persians, that it was considered as a mere appendage of Hyrcania. It was, nevertheless, the abode of a brave and warlike race, who opposed an effectual barrier to the Roman power in the east, and who succeeded in establishing a kingdom that extended from the Euphrates to the Ganges. There are no rivers of any importance. The chief town was Hecatompylos, usually identified with *Dameghan*—more probably *Jah Sirm*, situated under M. Caspius, in the northern part of the province; it received its name from the number of gates leading to the various routes. A later capital, named Sauloc, or Nisæa, in the district Nisæa, is of uncertain position.

7 HYRCANIA was a narrow strip of coast-land between M. Labuta and the Caspian Sea; M. Coronus separated it in the W. from Media; while towards the E. it stretched to the river Ochus. It corresponds with *Astrabad*, part of *Khorassan*, and the eastern part of *Mazanderan*. It was fertile in every sort of fruit and grain, and well-wooded, but much infested with wild beasts. The rivers have not been identified. The capital was Zadracarta, or Carta, probably also Syrinx, near the Caspian Sea. The Dahæ, frequently mentioned for their skill in riding and shooting, occupied the eastern part of the province; the Mardi the western.

8 ARIA,\* the most important of the eastern provinces, lay to the E. of Parthia, bounded on the N. by Sariphi Montes, which separated it from Margiana; on the E. by the district of Paropamisadæ; and on the S. by Drangiana. It corresponds with the southern part of *Khorassan*. It is intersected in the N. by ridges of the Sariphi Montes, and in the centre by M. Bagous, *Ghoor*, the western limb of Paropamisus. Its fertility was very great, and it was especially famous for its wine. The only river, the Arius, *Herat* or *Heri-rood*, rises in Paropamisus, and flowing towards the north-west, by *Herat*, loses itself in the sands. The towns were—Artacoana, or Alexandria Ariana, *Herat*, on the Arius, founded by Alexander in his march through Aria, on the site of the older capital: and Susia, on the borders of Parthia, the ruins of which are visible to the north of *Mushed*.

9 DRANGIANA, to the south of Aria, did not form a separate province under the Persians, but was first distinguished as such by Alexander. It was contiguous to Gedrosia on the S., Arachosia on the E., and Parthia and Carmania on the W., and corresponds with *Seistan*. The rivers of this province are—the Etymandrus, *Helmund*, which rises in the Indian Caucasus, and flows towards the south-west, discharging itself into the Lake Aria, *Zurrah*; and the Pharnacotis, *Furrah-Rood*, which comes from the borders of Aria, and flows into the same lake. The northern district was named Anabon, with the towns Phra, Bigis, and Gari, on the sites of the modern *Ferrah*, *Bceet*, and *Ghore*. In the south-east lived the Ariaspæ, or Euergetæ—i. e., *Benefactors*, so called because they rescued the army of Cyrus from death by starvation. They were for that service presented with their freedom. The towns of Drangiana were—Prophthasia, to the north of the Lake Aria; and Ariaspe, on the Etymandrus: the site of the former is probably at *Peshawaran*, to the north of the *Lake of Zurrah*.

10 GEDROSIA, now *Beeloochistan*, lay southward of Drangiana to the Persian Gulf, and occupied the interval between Carmania and the Indus. The north is generally fertile, but along the coast stretches an arid wilderness, in which the armies of Semiramis and Cyrus perished, and where Alexander's host, on their return from India, narrowly escaped the same fate. There are numerous mountain-chains in the interior, mostly running in a direction

\* The eastern provinces of Persia were occasionally comprised under the common appellation, ARIANA, a name derived from one of the provinces, Aria, and still existing in the modern *Iran*; the geographical use of that term has, however, led to great confusion, partly from the interchange of the terms Aria and Ariana, which are both applied to the province—partly from the undefined limits of Ariana, which is sometimes extended over Parthia and Media, as well as over the eastern provinces.

parallel to the sea, down which the torrents pour in winter, and supply the wells, on which the natives depend. The cultivated grounds abound with palms and aromatic herbs. Altogether, this province is not so desolate or impassable as Arrian's account would lead us to think. The rivers are mere mountain-torrents, swollen in winter and dry in summer: the most important are, the *Arabis*, *Poorally*, and the *Tomærus*, *Blusool*. The towns were—Ora, near the sea-coast, probably the same town as *Rambacia*, *Hoormara*, whither Alexander sent a colony: the inhabitants of the neighbourhood were of Hindoo extraction; *Omana*, a harbour in the west; and *Pura*, the capital in the interior, perhaps *Bunpoor*.

11 *ARACHOSIA* lay to the north of *Gedrosia*, between the rivers *Ety-mandrus* and *Indus*; on the north it was bounded by the ranges of *Paropamisus*. This mountainous and fertile province corresponds with *Candahar*, the north of *Beeloochistan*, and the south of *Cabul*. The chief range was known as the *Paryēti Montes*, *Soliman*, a southerly offset of *Paropamisus*. The river *Arachotus*, which, according to Ptolemy, flowed into the *Indus*, is either the *Lora*, which flows westward and loses itself in the sand, or the *Urghundab*, a tributary of the *Helmund*. The town *Arachotus* is of uncertain position; by some, the ruins of *Gholani-shah*, in the south, are identified with it. The more modern town of *Alexandria*, founded by Alexander, is very probably *Candahar*.

12 The *PAROPAMISADÆ*, the inhabitants of the mountain ranges of the *Paropamisus*, *Hindoo Coosh*, and of the modern province of *Cabul*, occupied the border land of Persia towards India. Alexander crossed this district twice in his eastern expedition: it is intersected in every direction with mountains, which are capped with snow for the greater part of the year, and contain beautiful and fertile valleys. The rivers flow eastward to the *Indus*—namely, the *Cophen*, or *Cophes*, the *Cabul*, with its tributary the *Pendshir*, and the *Choas*, *Kameh*, a northern tributary of the *Cabul*. The tribes were numerous: the *Cabolitæ* lived in the north, and have bequeathed their name to the district: their chief town was *Ortospana*, or *Carura*, probably *Cabul*, at the point where passes from the north, south, and east met. *Alexandria ad Caucasum*, founded by the emperor, was situated at the foot of *Paropamisus*, to the north of *Ortospana*, perhaps at *Ghorbund*, or *Bamean*. *Gauzaca* is probably the modern *Ghuznee*.

13 *BACTRIA*, or *Bactriana*, *Balk* was bounded by the *Oxus* on the N. and E., by *Paropamisus* on the S., and by the desert of *Margiana* on the W. It is, on the whole, a mountainous district, but contains some very fertile steppes and valleys, the former of which afforded pasture for a fine breed of horses, while the latter produced all sorts of grain and rice. The *Oxus* with its tributaries, the *Bactrus* or *Dargidus*, *Dehas*, and the *Artamis* water it. The towns were—*Bactra*, *Balkh*, on the *Bactrus*; *Zariaspe*, to the westward, but of uncertain position; *Aornus*, near *Bactra*, with a strong fortress; and *Drepsa*, or *Adrapsa*, to the south of the province, probably *Indorab*. Another *Alexandria* was built on the northern side of *Paropamisus*, near *Khooloom*.

14 *SOGDIANA*, to the north of *Bactria*, was bounded by the *Oxus* on the S. and W.; the *Iaxartes*, *Sihoun*, on the N.; and the *Comedarum Montes* on the E.: it corresponds with part of *Independent Tartary* and *Bokhara*; some portion is yet called *Sogd*. This province consists of extensive steppes in the W., rising gradually towards the high mountain-chains of Central Asia. The rivers were—the *Oxus*, *Sihoun*, already noticed, and the *Iaxartes*, *Sihoun* or *Sirr*: the latter formed the extreme northern limit of Alexander's expedition. The towns were—*Maracanda*, *Samarkand*, in the fertile valley of the *Polytimetus*, *Sogd* or *Kohik*, the capital: *Cyreshata* or *Cyropolis*, to the north-east, on a tributary of the *Iaxartes*; it was built by *Cyrus*, and destroyed by Alexander: *Alexandria Ultima*, on the *Iaxartes*, probably near the modern *Khojend*, founded by Alexander as a border-fortress: *Alexandria Oxiana*, probably near the modern *Kurshee*: *Tribactra*, north of the *Oxiana*

Palus, perhaps near *Bokhara*: and Bagoe, in the north-west, on the border of the desert.

15 MARGIANA lay to the south-west of Sogdiana, between Hyrcania on the W., Aria on the S., from which it was separated by the Sariphi Montes, and Chorasmia on the N.: it corresponds with the northern part of *Khorassan*: it is for the most part a sandy waste, interspersed with oases, which now afford herbage for the flocks of the wandering hordes of Turcomans. The river Margus, *Moorghab*, rises in the Sariphi Montes, and flows towards the north-west; formerly it united with the Ochus, and afterwards with the Oxus: at the present day it loses itself in the sands. We read also of a river Ochus in this province: it may be the *Tejend*, but the name is applied to so many streams, being apparently an appellative for 'river,' that it is impossible to identify it with any degree of accuracy. The towns were—Antiochia Margiana, *Mera*, founded by Antiochus Soter, near the banks of the Margus, on the site of a deserted town, Alexandria; and Misæa, probably in the north-west, on the border of Hyrcania.

16 Having thus described the various provinces which made up the country Persis, it remains for us to define the limits of the Persian kingdom, and of the various sovereignties into which it was subsequently broken up. The establishment of the Persian empire dates from the conquests of Cyrus, B.C. 558–529. He subdued Media, Babylonia, (with its dependencies, Syria, Palestine, and Phœnicia,) Assyria, Asia Minor, and the whole of Persia to the Oxus northward, and the Indus eastward. His successor, Cambyses, 529–521, added Egypt, Lybia, and Cyrene. Darius, 521–485, though unsuccessful against the Scythians, enlarged his dominions towards the west, by gaining possession of Macedonia, and towards the east, by an expedition against the tribes on the banks of the Indus and its tributaries. The commencement of the fifth century may be deemed the culminating period of the Persian empire. Though it began speedily to retrograde towards the commencement of the fourth century, yet the body of the empire held together until the conquests of Alexander, who added its vast dominions to the Macedonian empire, B.C. 330. After Alexander's death, Persia formed part of the Syrian empire, under the Seleucids: this dynasty had but a weak hold over the subordinate governors of the distant provinces: and hence arose in the north-eastern part of Persia two powerful independent kingdoms, Parthia and Bactria, which deserve particular notice.

17 The kingdom of Parthia, under the Arsacids, was established B.C. 250, and lasted until A.D. 226. It reached its greatest extent under Arsaces VI., circ. 160 B.C., who extended his conquests westward to the Euphrates, eastward to the Indus, and northward to the confines of China. The capital of this empire was Ctesiphon, on the Tigris.

The kingdom of Bactria rose at the same time as the Parthian, but did not exist longer than about one hundred and thirty years, from B.C. 250 to B.C. 126, when it was incorporated with Parthia. We know little of the history of this kingdom: its rulers appear to have extended their sway over North India, Malabar, and as far as the confines of China.

18 The old Persian kingdom was restored, A.D. 226, by Artaxerxes, the first of the Sassanides, who incorporated Parthia and all the ancient provinces of Persia, between the Indus, Oxus, Euphrates, and the Persian Gulf, into an empire, which existed with various fortunes into the Middle Ages.

## VII. *Sarmatia Asiatica.*

The countries that lie in the northern and eastern regions of Asia, beyond the Caucasus and the Iaxartes in the former direction, and beyond the Indus in the latter, were little known to the geographers of Greece and Rome. A very brief account of them will therefore suffice. The district immediately north of the Caucasus, bounded on the west by the Tanais, *Don*, and on the east by the Rha, *Volga*, was entitled Sarmatia Asiatica. The

eastern ranges of M. Caucasus, which penetrate to the northern extremity of the Caspian Sea, were called the Ceraunii Montes; a low range between the *Don* and *Volga*, the Hippici Montes; and the western range of the Caucasus, near the Cimmerian Bosphorus, was distinguished as Coraxicus. The general course of the *Volga*, with its tributary, the *Kama*, is described with tolerable accuracy by Ptolemy. The *Don* was also well known, and one of its tributaries in Sarmatia, the Achardeus, *Manytch*, is mentioned: some of the lesser rivers also, as the Anticites, *Kuban*, also called Vardanus; the greater and less Rhombites, the *Ieia*, and the *Beisu*, flowing into the Euxine; and the Udon, *Kouma*, and Alonta, *Terek*, flowing into the Caspian.

Sauromatæ or Sarmatæ is the generic name for the people inhabiting this vast district: of the numerous tribes, whose names are recorded, we will only mention the Sindi, who occupied the angle formed by the Palus Mæotis and the Euxine; the Bosporani, about the Cimmerian Bosphorus, who subdued the Sindi, and established a kingdom of much importance; the Achæi, on the shore of the Euxine, reputed to be the descendants of some Achæan settlers, who came here after the Trojan war; the Siraceni, or Siraci, near the eastern extremity of the Euxine; the Aorsi or Adorsi, on the northern coast of the Caspian and north of them the royal Sauromatæ. The Budini and the Thyssagætæ of Herodotus would also fall within the limits of Sarmatia.

The towns were—Sinda, a Greek town, south of the Bosphorus; Phanagoria, a Milesian colony, on the Bosphorus, the chief emporium in these parts; Tanais, also a Milesian town, at the mouth of the Don, a place of considerable trade; and Uspc, the capital of the Siraci. Between the northern extremities of the Caspian, and Euxine, Ptolemy places Columnæ Alexandri. As Alexander did not enter these regions, it has been conjectured that the pillars may have been erected here by Sesostris.

#### VIII. *Scythia, Serica, Sina.*

I The remainder of northern Asia received the undefined appellation Scythia, which Ptolemy divides into two parts, Scythia intra and Scythia extra Imaum—i. e., to the W. and E. of Imaus. In the W. the Rha separated it from Sarmatia; in the S. the Iaxartes from Sogdiana, and the Emodus from India: towards the N. and E. its boundaries were undefined: in the latter direction it was contiguous to Serica. The Hyperborci Montes which formed the western barrier of Scythia correspond with the *Ural Mountains*: the northern ridges were called Alani Montes, the southern Rhymnici, E. of the Volga, containing the sources of the Rhymnus, *Gasuri*, which flows into the Caspian eastward of the Volga: the Norossus was another limb of the same range, containing the sources of the river Daix, *Ural*, which also joins the Caspian. The Aspisii Montes, the waters from which flow into the Iaxartes, correspond with the *Tchingis Mountains*: the Tapiri range lay to the eastward of the Caspian: Ms. Anarci formed the connecting link between the *Ural* and *Altai* ranges, the Annibi and Auxacii of the ancients. Besides the Rhymnus and Daix we read of a river Paropamisus, probably the *Obi*.

The tribes of Scythia were distinguished in Herodotus's time into three classes—the royal, the agricultural, and the nomad—a distinction which, however, applies more properly to the European than the Asiatic Scythians; for Herodotus (it must be observed) extends Scythia over what is more generally called Sarmatia. The most important races in western Scythia were—the Aorsi, who occupied the country eastward as well as westward of the Rha, and the Massagætæ, a powerful tribe, occupying a great portion of *Independent Tartary*, *Khiva*, and the steppes of *Kirghiz*, southwards to the Iaxartes. They probably derived their name from the river *Mias*, which has its rise in the Ural Mountains. To the E. of these were—the Sacæ in the steppes of the *Kirghiz Khasaks* to the west of the great desert of *Gobi*: the great route to Serica lay through their country, where we may place the *Turres Lapidæ* or *Formeterium* of Ptolemy, a fortified caravanscray, supposed to be situated in

the pass called *Chalsatan*: the Thyssagetæ and the Tyrcæ, the progenitors of the modern Turks, lived about the upper courses of the *Volga* and the *Kama*: N. of these the Argippæi, also called by Herodotus Phalacri or Bald-heads, the progenitors of the *Kalmucks*; the name Argippæi denotes the use of white horses by this tribe—a peculiarity yet existing among some of the Siberian tribes: in the north were the Arimaspi, the inhabitants of the Ural range, whose occupation consisted in working the gold mines of that region. In Scythia extra Imaum, we hear of the Auzacitæ with a town Auzacia; S. of these, the extensive tribe of the Issedōnes in *Thibet*: and the land of Casia to the westward under Imaus. In the extreme N. amid the ridges of *Altai*, dwelt the Abii and the Hippophāgi Scythæ.

2 Serica corresponds with *Mongolia*, and the north-western parts of *China*. It was intersected by the Asmirai Montes, the *Siolki Mountains*. The rivers known to the ancients were the Echarides, perhaps the *Amour*, and the Bautes, the *Hoang-ho*.

This country was celebrated for the manufacture of silk, which was carried overland through Scythia and Parthia to Rome and the western parts of Europe. The capital, Sera, was situated in the N.W. of China, perhaps near *Singan* or *Honan*. Other towns are mentioned of uncertain position, as Isselon Serica, Asmiræa, &c.

3 The Sinæ dwelt to the S. of Serica in *Cochin-China*, *Camboja*, and the southern parts of *China*. Ptolemy, who describes this country, does not assign the ocean as the eastern boundary, imagining that the continent might stretch out farther. To the W. it was contiguous to India extra Gangem, from which it was separated by the Magnus Sinus, *Gulf of Siam*, the river Aspitlra, *Bangpassæ*, and more to the north by the Semanthini Montes. The other rivers mentioned by Ptolemy are the Ambastus, *Camboja*, the Senus, and the Cottiaris, probably the river of *Canton*. The only towns known were Thinæ, perhaps *Nanking*, and Cattigara, *Canton*.

## IX. India.

India was bounded on the N. by the chains of Paropamisus, Imaus, and Emodus; on the W. by the Indus; on the E. by the Aspitlra and the Magnus Sinus; and on the S. by the Indian Ocean. It was divided by Ptolemy into two portions, India intra Gangem, corresponding to *Hindustan*, and India extra Gangem, the *Birman Empire*, part of *Siam*, and the *Malay peninsula*. The ancients were unacquainted with the direction of the coast between the Indus and Ganges: Herodotus describes the Indus as flowing to the E., and beyond it a desert; Eratosthenes gives the Indus its true direction, and carries us to the Ganges, but omits all notice of the peninsula of Hindostan, and places Taprobane, *Ceylon*, beyond the Ganges; Strabo falls into error in making the Ganges flow into the eastern Ocean; he rightly places Taprobane between the Indus and Ganges, but makes Coliacum, *C. Comorin*, the most eastern point of the world; Ptolemy lastly, who was acquainted with the form of the Malay peninsula, gives a very slight protrusion to Hindostan, and assigns an undue size to *Ceylon*. They were, nevertheless, well acquainted with the general features of the country; they gave distinct names to the various ranges into which the great Himalaya range breaks up to the N. of the Birman Empire—the Semanthini Montes, the Damassi, and the Bepyrus; the western *Ghants* in Hindostan were called M. Bittigo; the *Sautpura*, Sardonix; the M. Vindius, to the N. of the last mentioned, retains its name, the *Vindhy Mountains*. The promontories are also noticed—viz., Prom. Magnum, *C. Romania*, Malri Colon, *Junk-Ceylon*. Cory, or Coliacum, opposite to Ceylon; and Comaria, *Comorin*.

The rivers were also known; but it is difficult for us to identify them with any great certainty. In the E., the Serus is probably the *Meinam*, the Dorias the *Thaleain*, and the Doanas the *Irawaddy*. The Dyardanes is the *Brahmaputra*; the Ganges and the Indus retain their ancient names;

the affluents of the Indus are described in the account of Alexander's campaign; viz. the Acesines, *Achenab*; the Hydaspes, *Jelum*; the Hydraotes, *Ravee*; the Hypanis, or Hyphasis, *Gharra*; the Hesidrus, *Sutlege*; and the chief tributary from the W., viz., the Cophes, *Cabul*, with its tributaries, the Choaspes, or Evaspla, or Coes, *Kameh*, and the Guraus, or Suastus, the *Punjora*, a branch of the *Jandee*, or perhaps the *Lundee* itself.

India does not take any prominence in the political geography of the ancient world. Alexander the Great gained a temporary supremacy for himself over the inhabitants of the Punjab; Seleucus penetrated to the Ganges, and succeeded in forming alliances with the independent kings, and in establishing an embassy at Palimbothra. The Bactrian kings extended their dominion over the western provinces, which, after the overthrow of their power, were divided between the Parthians and the Scythians.

The towns and places worthy of notice are—Perimûla, *Malacca*; Bessynga, *Pegu*, with the Golden region to the north: Gange, at the mouth of the Ganges; Pandionis Regnum, at the southern extremity of the peninsula of Hindostan; Comaria, *Comorin*; Ariaca, the central region from *Bombay* to *Hydrabad*, with its two capitals, Hippocura, *Hydrabad*, and Batana, *Beder*; northward of Asiaca along the western coast, the district of Larice, with the towns Ozenc, *Oucen*, and Barygaza, *Baroche*; the district Pattalenc, about the mouths of the Indus, and the town Pattala, *Tatta*; in the Punjab, Nagara, the same as the Nysa of Alexander's historians, *Nagar*; Peucela, *Pekhely*, on the Cophes; the district of the Gundaræ, between the Suastus and Indus; and Caspira, *Cashmir*, where we must place the town Caspatyrus, and the district Paetyica, mentioned by Herodotus. Taxila was not at *Attock*, but to the E. of it, in the district called Varsa.

Off the coast of India lie the following islands:—Taprobane, also called Simundu, and Salice, in which last we recognise the modern name *Ceylon*; Bonæ Fortunæ Insula, probably *Sumatra*; Jabadii, probably *Jara*; Satyrorum Insulæ, the *Anamba* isles, off the eastern coast of the Malay peninsula; and Sindæ Insulæ, the *Nicobar Islands*.

## CHAPTER IV.

### I. SYRIA.—II. PHœNICIA.—III. PALÆSTINA.—IV. ARABIA.

#### I. Syria.

SYRIA lay between the Euphrates on the E., and the Mediterranean Sea on the W.; towards the N., M. Amanus separated it from Cilicia; and towards the S. an arbitrary line through the desert separated it from Arabia. In its western parts it is mountainous, offsets from Amanus traversing it in a southerly direction to the borders of Palestine. The most important of these ridges are—M. Pieria, immediately to the S. of Amanus; M. Casius to the S. W. of Antioch, and in the S. the ranges of Libanus, *Lebanon*, and Antilibanus, *Djebel-es-shurky*. M. Libanus runs parallel to the Mediterranean Sea, leaving a narrow interval of coast land: its summits are covered with perpetual snow, while forests of cedar-trees clothe its upper regions, and vineyards its base. Antilibanus commences more to the S. with M. Hermon, *Djebel-es-scheikh*, but does not run so far N.; its course is parallel to Libanus; the two ranges enclose a valley, about six miles broad, which was called Cœle-Syria—a name which was afterwards extended to the whole surrounding district. The eastern, and by far the most extensive portion of Syria, consists of an unbroken plain, which leaves the right bank of the Euphrates near Thapsacus, and thence extends into the neighbourhood of Damascus. The chief rivers are—the Orontes, *Asy*, which rises

in Antilibanus, near Heliopolis, and flows in a northerly course until it reaches the vicinity of Antioch, where it bends round to the S. W., and reaches in that direction the Mediterranean; the Chalus, river of *Aleppo*, a small stream in the N. of the country, flowing by Berrra and Chalcis into a lake; the Singas, *Sensja*, and Daradax, tributaries of the Euphrates; the latter is taken to be either the *Sajur*, or an artificial canal near the ruins of *Ba'lis*.

Syria was divided into two districts, Upper and Lower; the latter was also called hollow or Cœle-Syria, being the region enclosed by the arms of Libanus and Antilibanus. Upper Syria was subdivided by the Romans into ten provinces: Commagene in the N.; below it, Cyrrhestice; Pieria, on the Bay of Issus; Seleucis about Antioch; Chalybonitis, eastward to the Euphrates; Chalcidice, bordering on the desert; Apamene, eastward from Apame; Cassiotis, between this and the sea; Palmyrene, the desert region about Palmyra, and Laodicene to the westward. The important towns were—Samosata, *Someisat*, in Commagene, on the right bank of the Euphrates, the ordinary point of transit from the N. to Mesopotamia; Hierapolis, in Cyrrhestica, ruins at *Bambuch*, on the river Sangas, the capital of the N. in Constantine's time; it derived its name from the worship of Derceto; Myriandrus, a sea-port town, originally colonized by the Phœnicians, on the Bay of Issus; it was afterwards called Alexandria ad Issum, and is now represented by *Iskenderun*: Seleucia, in Pieria, a very strong fortress built by Seleucus, situated on a rock, and accessible only on the side of the sea; it offered a stubborn resistance to Tigranes: Thapsacus, the Tiphshah of Scripture, on the Euphrates, *el Deir*, the place where in early times travellers crossed this river for Babylon; Palmyra, *Tadmor*, in the desert, about midway between the Euphrates and the sea; it was in existence in the days of Solomon, and in the first century of our era was the capital of a small independent state, between the Roman and Parthian empires: in the third century, Zenobia beautified it with the splendid buildings, the ruins of which yet exist; it fell about the end of that century by the Romans: Laodicæa Scabiosa, to the north of Antilibanus, built by Seleucus Nicator; Apamæa, the capital of Apamene, near the Orontes, built by Seleucus, and named after his wife, Apama; the town was surrounded on all sides but one by a lake formed by the small stream Axius; the ruins of it are supposed to be at *Kulat-el-Medyk*; the pasture lands about it supported an admirable breed of horses: Emêsa, *Hums*, celebrated for the temple of the Sun, in which Heliogabalus ministered as priest; Antiochia, *Antakia*, on the banks of the Orontes—the splendid capital of the kingdom, built by Seleucus Nicator, and enlarged by his successors, Callinicus, and Antiochus Epiphanes; it was often partially destroyed by earthquakes, but as often restored; and it became the Proconsular residence under the Romans: lastly Laodicæa, *Ladikiyeh*, on the sea-coast, to the S. of Antioch, in Strabo's time one of the four great cities of Syria; it was built by Seleucus Nicator, on a tongue of land, and thus easily fortified; in addition to this, it enjoyed the advantage of an excellent harbour.

In Cœle-Syria, there were two celebrated cities, Damascus and Heliopolis. Damascus, which retains its ancient name, the ancient capital of Syria, was situated in a beautiful plain on the banks of the stream Chrysorrhœas, or Bardines, *Barada*, which divided into five channels before entering the town, and afterwards reuniting, discharged itself into a lake. One of the five branches, now called *Banças*, is thought to correspond with the Abana of Scripture, while a small tributary of the Barada, the *Fidsheh*, answers to the Pharpar. Damascus sunk under the Syrian dynasty, but revived when Diocletian established a manufactory of arms there. Heliopolis, the Greek rendering of the native name *Baalbek*, lay between the ridges of Libanus and Antilibanus. It was celebrated for the magnificent temple of Jupiter, erected by Antoninus Pius. The cycloplan remains of the temple of the Sun, as well as the extensive ruins of Antonine's temple, are yet objects of wonder and admiration.

2 The kingdom of Syria extended far beyond the border of the province



of that name under the government of Alexander's successors. \* Before that time, it had not taken any position in history as an independent nation; when we first hear of it in sacred history, it seems to have been parcelled out into a number of small principalities; subsequently it became a portion of the Assyrian, Babylonian, Persian, and Macedonian empires. After the death of Alexander, and the dismemberment of his kingdom, Seleucus Nicator succeeded in establishing a dominion over all the Asiatic provinces. He fixed his capital in the first instance at Seleucia on the Tigris, but after the battle of Ipsus, transferred it to Antioch in Syria. His dominions extended from the western border of Phrygia in Asia Minor to the Indus eastward, and from the Taurus northward, to the Persian Gulf and the confines of Egypt. No sooner, however, was the kingdom established, than the work of decay began. Independent monarchies were gradually set up in Asia Minor; Parthia and Bactria seceded; Phœnicia and Palestine fell into the hands of the Egyptians; Antiochus the Great (223—187) for a while restored the fame and power of his family; but in about sixty years after his death, the dominion of his successors was confined to Syria and Phœnicia. In the year 64 B.C., Syria was added to the Roman empire.

### II. *Phœnicia.*

Phœnicia was a narrow strip of coast land, shut off from Syria by the range of M. Libanus, extending northwards to Aradus, and southwards to M. Carmel, and in the Roman era lower still, to Cesarea. The only mountain range is Libanus, which projects into the sea in the promontories of Theuprosōpon in the N., and Album, *White Cape*, in the S.

The towns in Phœnicia were: Aradus, (in Scripture Arrad,) *Road*, on an island about two and a half miles from the mainland; under the Seleucidæ it attained the rank of third city in Syria: Tripōlis, *Tripoli*, on a spur of Libanus, with a good harbour; it consisted (as the name implies) of three separate towns, representatives of the three great cities of Tyre, Sidon, and Aradus: Byblos, *Jebeil*, the Gebal of Scripture, whence the 'stonesquarers,' the Glibites (1 Kings, v. 18, compare margin), came for the erection of Solomon's temple, a short distance from the sea, celebrated for the worship of Adonis: Berytus, Berothah in Scripture, *Beirut*, an ancient sea-port town, which, having been destroyed B.C. 140, was afterwards restored under Augustus, and made a Roman colony: it was much embellished by King Agrippa: Sidon, *Saida*, the oldest and after Tyre the most celebrated Phœnician town; it was situated on a narrow plain, with a good harbour and strong fortifications; it was dismantled and sacked by Artaxerxes Ochus, and never afterwards regained its original prosperity: Tyrus, *Sur*, probably a colony of Sidon, the celebrated capital of Phœnicia; it was originally built on the mainland, but after the siege it sustained by Nebuchadnezzar, it was removed to a small island, less than half-a-mile distant from the shore, and so confined that the inhabitants were obliged to build out on dams and piles: Alexander conquered it after a seven months' siege, B.C. 332, by running out a mole from the mainland: Ptolemæis, *Acre*, formerly Aca, the Acelio of Scripture, which rose into notice after the decay of Tyre; it became a Roman colony under the Emperor Claudius.

### III. *Palæstina.*

The name Palæstina, *Palistine*, is derived from Philistia—the land of the Philistines—and was never applied by Hebrew writers to anything beyond the maritime district occupied by that people. In the patriarchal era, it was usually called the 'Land of Canaan;' during the period of Jewish independency, the 'Land of Israel;' and lastly, after its subjection to the Romans 'Judæa,' being an extended use of the name originally attached to the southern district. Palestine was bounded on the W. by the Mediterranean (described in Scripture as the Great Sea) from its southern angle to M. Carmel, and

thenceforward by Phœnicia; on the N. by the ranges of Libanus and Antilibanus; on the E. by an arbitrary line on the side of the Syrian desert, which in the north protruded so far as to include M. Alsadamus, *Hauran*, and the districts of Trachonitis and Decapolis, and then receded westward to the edge of the hilly country, which it followed to the course of the Arnon and the Dead Sea; and on the S. by an undefined boundary, which ran S. of Beersheba, separating it from the desert of Edom, *el Tih*.

Palestine is decidedly mountainous: the ranges of Libanus and Antilibanus, entering from the north, traverse its whole length in a series of parallel heights, divided by the river Jordan, and finally decline towards the deserts of Arabia and Syria. The chain is interrupted in the western district by the valley of Jezreel, and in the eastern by the high plain that extends eastward from the Sea of Galilee. The most prominent elevations are—M. Tabor, *Tur*, S.W. of the sea just mentioned; M. Carmelus, *Carmel*, a long ridge running out towards the N.W. into the Mediterranean, and forming the only promontory on the coast of Palestine; M. Ephraim, passing down the centre of the province of Samaria, with the twin heights of Elbal and Gerizim, on the latter of which the temple of the Samaritans stood; M. Juda, the hill country of Judæa between the Dead Sea and the Mediterranean; Albarim Montes on the opposite of the Dead Sea, with the points Peor, Nebo, and Pisgah; M. Gilead, *Jelad*, eastward of Jordan, and south of the Jabbok; M. Hermon, *el Scheikh*, the highest point of Anti-libanus, generally capped with snow, extending southwards in a long ridge, now called *el Heisch*, towards the eastern shore of the Sea of Galilee; and, lastly, M. Alsadamus, *Hauran*, a group of isolated heights on the border of the Syrian desert.

The hills enumerated rise out of a high *plateau*, which is unequally divided into halves by the valley of Jordan: the western declines gradually towards the Mediterranean, leaving a fertile plain along the coast; the eastern similarly falls off towards the Desert; both descend sharply towards the Jordan, at some distance, however, from its banks, thus leaving a distinctly marked plain, varying from six to twelve miles in width along its midcourse. This plain, now called *el Ghoor*, lies at a remarkable depression below the level of the sea, varying from 300 feet at the Sea of Galilee to 1300 at the Dead Sea: it is consequently subject to intense heat, is devoid of springs, and unfit for cultivation. The Jordan, which traverses it, rises in the high ridges of Antilibanus: after a course of fifteen miles it enters the Lake of Merom, *el Huleh*, which, in the summer months, is a mere swamp, but becomes a considerable sheet in the spring: then after a short interval, the lake which was called indifferently after Gennesareth, Galilee, or the town of Tiberias, from which last it derives its modern name, *Bahr el Taberick*. This lake is supposed to lie in the crater of an extinct volcano; it is fourteen miles long by six in breadth, and surrounded by hills, which rise precipitously on its eastern shore, but on the western, slope gradually down and admit of cultivation: it is described as still abounding in fish, and like all mountain lakes, liable to sudden gusts. The Jordan emerges at the south-western angle, receives on its left bank the Hieromix, *Scheriat el Mundhur*, and the Jabbok, *Zurka*, and discharges itself into the Dead Sea. This remarkable lake was called, by the Hebrews, the Salt or East Sea, and by geographers, *Lacus Asphaltites*, or *Mare Mortuum*: its modern name is *Bahr Lut*—i. e., Lot's Lake. At its northern extremity, a sandy plain surrounds the mouth of the Jordan; at the southern, a rocky valley opens towards the western arm of the Red Sea. In all other parts it is surrounded with high, barren rocks, separated here and there by steep gullies. The waters are remarkably heavy and bitter, and the shores are covered with scorïæ and incrustations of salt and asphaltum: its length is about fifty miles, its average breadth may be about twelve: it occupies the site of the once fertile valley of Siddim, in which stood the cities of Sodom and Gomorrah. Besides the Jordan, the Arnon, *Wady Mojib*, and the Kidron, *Wady el Rahib*, discharge themselves into it, the former on the eastern, the latter on the western shore. The only

other river of importance in Palestine is the Kishon, *Mukutta*, which rises in M. Gilboa, and traverses the rich valley of Esdraclon towards the N.W., discharging itself into the Mediterranean, just north of Carmel. The face of the country is further broken by numerous small valleys, some of which were watered by perennial streams, others by mountain torrents, which dried up in summer, while others were little else than ravines or gullies. The Hebrew language expressed these distinctions by appropriate terms.

All ancient writers agree in assigning to the soil of Palestine remarkable fertility, which was further increased by the most careful cultivation. The valley of Esdraclon, or Jezreel, along the Kishon, and the maritime plain of Sharon, extending from Casarea to Joppa, are much extolled for their productiveness; the sides of Carmel and the wide open country of *Hauran* (the ancient Bashan) afforded excellent pasturage; the high land of the interior yielded a good return to the husbandman, and the sides of the hills were clothed with the vine and the olive; wood for building and fuel was obtained from the tops of Carmel and Tabor, from M. Ephraim in Samaria, from the forest of Hareth in Judæa, and from the hill of Gilead in Peræa. The variations of temperature, corresponding with the different altitudes of localities, conduced further to increase the number of its productions.

The early historical notices of Palestine represent it in the possession of various tribes of the Canaanitish family, living independently of each other, and subsisting upon their flocks and herds. These were for the most part ejected by the Jewish nation, under Joshua, B.C. 1451, who divided the land between their twelve tribes—Reuben, Gad, and the half-tribe of Manasseh occupying the district east of Jordan. The division of the kingdoms under Jeroboam, B.C. 976, led to a further distinction, the two tribes of Judah and Benjamin forming the kingdom of Judah, and the remaining ten tribes the kingdom of Israel. The captivity of the latter, B.C. 721, was followed by the introduction of a mixed population in the northern and central districts. From the capture of Jerusalem, B.C. 599, Palestine formed a portion of the Babylonian and afterwards of the Persian empire. It was incorporated along with the latter in the vast empire founded by Alexander the Great, B.C. 332; after his death it was apportioned to the Syrian kingdom, but for a long period was under the actual power of the Egyptian Ptolemies: it returned to Syria, B.C. 205; separated from it under the Maccabees; and maintained its independency, until intestine divisions led to the interference of the Romans, who obtained a supremacy over it, B.C. 63, and at last annexed it, A.D. 7, to the province of Syria. At the time of our Saviour's appearance upon earth, Palestine, west of the Jordan, was divided into three districts—Galilee in the N. southwards to the river Kishon; Samaria in the centre, with the exception of the sea coast; and Judæa, which held the sea-coast from above Casarea together with all that lay south of Samaria. The remaining portion of Palestine was sometimes called Peræa—i. e., the land *across* the Jordan: it was subdivided into numerous districts—viz., Peræa, in its limited sense, from the Arnon to the Jabbok: Decapolis, about the Hieromix, where a confederacy of ten towns existed, one of which, Scythopolis, lay westward and the rest eastward of the Jordan: Batanæa, part of the old kingdom of Bashan, bordering on the desert from the Jabbok to the *Hauran* range: Auranitis, the plain of *Hauran*, westward of that range: Trachonitis, north of the latter, on the border of the Syrian Desert: Ituræa (the Jetur of the Old Testament), in the north-eastern angle, not far from Damascus; and Gaulonitis, the mountainous region of Hermon. In the later division of the Roman empire, Palestine formed three provinces—*Palæstina Prima*, comprising Samaria and the northern half of Judæa; *P. Secunda*, Galilee and northern Peræa; *P. Tertia*, the southern parts of Peræa and Judæa.

The metropolis of Palestine was the holy city of Jerusalem—the ancient Jebus, and probably the Cadytis of Herodotus—in the tribe of Benjamin and the north of Judæa. It was situated on an elevated platform, and surrounded

by yet higher hills, from which it was separated by deep ravines on all sides except the north. The platform sloped somewhat towards the east, and contained three eminences—Zion at the southern extremity, on which the ancient city of David, and in later times the palace of Herod stood; Moriah, towards the east, the site of Solomon's Temple; and Acra, in the north, on which Antiochus Epiphanes erected his citadel, and afterwards the Romans their fort of Antonia. Zion was the highest, and hence that part of the town was called the *upper city*—the *lower* was situated on Acra. In the time of the Herods a new quarter was added on the north side, named Bezetha, which Herod Agrippa surrounded with fortifications. The brook Cedron flowed in the valley below the Temple, and on the opposite side rose the Mount of Olives; a tributary stream, the Gihon, followed the base of Zion, on the west and south. Jerusalem was destroyed by Titus, A.D. 70, and restored by Hadrian, B.C. 126, with the name *Ælia Capitolina*.

The other towns of importance in Palestine were; in Judæa—Gaza, *Ghuzzeh*, a fortified town on the southern frontier, about two and a half miles from the sea, which stood a long siege against Alexander: Joppa, *Jaffa*, on the sea coast, the port of Jerusalem, in the fertile plain of Sharon: higher up the coast, *Cæsarea*, *Kaisariyeh*, originally an unimportant place, with the name Stratonis Turris, but enlarged and made the chief port of Palestine by Herod the Great: Vespasian changed its name to Colonia Prima Flavia; it was the residence of the Roman governors, and afterwards the capital of *Palæstina Prima*: Hebron, in the hill country, westward of the Dead Sea: Bethlehem, the birthplace of our Saviour, about six miles south of Jerusalem: Jericho, *Riha*, north-east of Jerusalem, on a rich plain which extended to the Jordan. In Samaria—Sichem, called by the heathen writers *Neapolis*, whence its modern name *Nablous*, situated in the valley between Ebal and Gerizim; it was the holy town of the Samaritans, having their temple on the neighbouring hill: Samaria, the capital, strongly posted on a hill in the centre of the province; it was built by Omri, and twice destroyed, but as often restored; Herod the Great enlarged and fortified it, giving it, in compliment to Augustus, the name of Sebaste, which is still preserved in the modern name *Sebustieh*: Jezreel, *Zer'in*, the royal residence of Ahab, in the fertile plain of Esdraelon: Scythopolis, (Bethshan in the Old Testament,) *Beisan*, about six miles west of Jordan; it derived its Greek name from a settlement of Scythians—a remnant of the horde which overran Western Asia in the latter part of the seventh century, B.C. In Galilee—Nazareth, *Nasirah*, the residence of our Saviour's parents, midway between the Sea of Galilee and the Mediterranean: Sepphōris, *Sefurih*, northward, an unimportant place until Herod Antipas enlarged it, and named it *Diocæsarea*: Tiberias, *Tahariyeh*, about midway down the western shore of the Sea of Galilee, also built by Antipas, and named after Tiberius; it ranked as the capital of Galilee: Capernaum, *Tell-hum*, towards the northern extremity of the lake, the usual place of our Saviour's abode: Bethsaida, the birthplace of Andrew and Peter, a little south of Capernaum: it must not be confounded with the Bethsaida Julius at the head of the lake. In Peræa—Cæsarea Pæneas or Philippi, near the source of the Jordan, enlarged by Philip the Tetrarch, and named after him: Gadāra, *Umm Keis*, south of the Hieromix, the capital of

Gilead, on the southern declivity of M. Gilcad: Rabbath Ammon, *Amman*, to the south-east, also called Philadelphia, after Ptolemy Philadelphus; and Rabbath Moab, Ar of Moab, and later Arcopolis, on the banks of the Arnon.

#### IV. Arabia.

Arabia was bounded in ancient as in modern times, on the W. by the Sinus Arabicus and the *Isthmus of Suez*, on the S. by the Mare Erythræum, on the E. by the Sinus Persicus, on the N.E. by the Euphrates, and on the

N. by Syria and Palestine, from which it was separated by no natural limit. The term Arabia is frequently used in a more extended sense, to signify all the lands which the nomad Arabians frequented; Herodotus thus includes all Syria, and Xenophon the lower parts of Mesopotamia, under Arabia. It was divided into three regions, Deserta, the sandy desert in the north; Petræa, about the head of the Red Sea, to the confines of Egypt and Palestine; and Felix, by far the largest portion, to the south. A line drawn across the peninsula about three degrees below the heads of the Persian and Red Seas, would indicate the limits of Arabia Felix towards the north. The names of the several districts represent their character; Petræa, the *rocky*, Felix, the *fruitful*, a title certainly misapplied as respects the south-eastern coast and a great part of the interior, and Deserta, the *desert*.

The inhabitants of these various districts differed much in pursuits and character. Those on the sea-coast prosecuted an extensive trade with India and Southern Africa, and exchanged the produce of these countries for European merchandize; they were a clever, enterprising, wealthy, and luxurious class. The tenants of the vast plains in the interior (the progenitors of the modern Bedouins) led a simple nomad life, dependent on their flocks and herds, and maintained a patriarchal form of government. The border tribes were given to predatory habits, and attacked the caravans of neighbouring nations; they thus gained a character for ferocity.

The mountain system of Arabia is easily described; the ranges of Northern Asia entering from the north by the course of the Mediterranean Sea, divide into two branches; the ridges of the western form the peninsula of Arabia Petræa, while the other, following the direction of the Red Sea, and increasing in extent as it goes southward, terminates at the junction of that sea with the Indian Ocean. The mountains of Arabia Petræa received the appellation Nigri Montes; they culminate in the celebrated heights of Sinai, *Djebel Musa*, and Horeb, *Djebel Horeb*, in the southern part of the peninsula; Horeb is the lowest of the two points, and lies to the east of Sinai. The southern range did not receive any specific name. In its middle course an extensive range strikes off into the desert, *M. Zamētus*, *Djebel Aared*, and crosses to the Persian Gulf. From the south-western point of Arabia a range takes a north-easterly direction along the shores of the Indian Ocean, a part of which, rising into terraces, was named Mount Climax.

The earliest accounts of the inhabitants of Arabia are derived from Scripture. In Arabia Petræa, which the children of Israel traversed in their journey from Egypt to Canaan, dwelt the Amalekites to the border of Egypt to Sinai southwards; and eastward of them, the Edomites, in Idumæa to the south of Palestine as far as the head of the Ælanitic Gulf of the Red Sea; they occupied the high ridges of Seir, a wild, rugged region, interspersed with sheltered and fruitful valleys. From various passages of Scripture (Gen. xxvii. 39; Numb. xx. 17; Mal. i. 3) we may infer that it was in earlier times much more cultivated than at present. The name of Idumæa disappears from history in the first century of our era. The Themanites were a subdivision of the Edomites living eastward of Petra, in the neighbourhood of *Maan S. of Wadi Musa*. North of the Edomites, were the Moabites on the eastern shore of the Dead Sea, from the river Arnon southward to Zoar. Their chief town, Ar, or Rabbath Moab lay in the northern part of the district, the character of which, though mountainous, was eminently fertile. North of the Moabites, the Ammonites, between the rivers Jabbok and Arnon, with the town Rabbath Ammon, or Philadelphia. The Midianites were a populous tribe in the south of Arabia Petræa. Their original seats were to the west of Sinai, whence they removed eastward of the Ælanitic arm of the Red Sea. In the time of the Judges they were possessed of considerable wealth in flocks and merchandize. In later times the people inhabiting this district passed under the name of the Nabathæi (the Nabathites of the Maccabees)—i. e., the descendants of Nebaioth, son of Ishmael. Josephus represents them as occupying not only Arabia Petræa, but also Deserta to

the banks of the Euphrates. Their permanent settlement seems, however, to have been near the Ælanitic Gulf, and about Petra, which was probably their capital town.

The towns mentioned in Scripture history in Arabia Petraea are, Elath, or Ælana, a sea-port town at the head of the Ælanitic Gulf, whence Solomon's fleet set sail for Ophir; and more to the westward, Eziongeber, the same as the Berenice of Josephus, also a sea-port. The capital of the country, Petra, is not mentioned in Scripture under that name, but is probably identical with Selah of 2 Kings, xiv. 7, (cf. margin,) and 'the rock' mentioned Judges, i. 36. It was situated midway between the Dead Sea and the Ælanitic Gulf, and was built on, or rather out of a rock, the habitations, temples, tombs, and other buildings, being hewn out of the solid stone. It was also surrounded by precipitous heights, and accessible only by a narrow pass on the east, which might be defended by one hundred men. It was important not more as a military than as a mercantile station, being the centre, in which the caravans from the coasts of the Persian Gulf, from the south of Arabia, from Egypt, and from Palestine and the north, met for the exchange of their commodities.

In Arabia Deserta, we read in the Old Testament only of the descendants of Kedar, who roamed over the wastes between the borders of Canaan and the Euphrates. In Classical Geography the tribes were called generally Scenitæ—i. e., dwellers in tents, with various specific names, among which the Saraceni, indicative of banditti habits, is the only one worthy of notice. It was applied by Ptolemy to a single tribe in the south of Arabia Deserta, and afterwards extended to all the predatory tribes.

The tribes of Arabia Felix are hardly known otherwise than by name. The Sabæi, indeed, are frequently mentioned, on account of the celebrated productions of their district—balsam and spices; they lived in the northern part of the modern *Yemen*, which corresponds with the Sheba of Scripture. Their chief towns were Sabæ in the interior, and Ocelis, or Acila, on the Straits of *Babel-mandeb*. In the early centuries of our era, the Homeritæ seem to have been the dominant tribe; their seats were in the extreme southern corner of Arabia, and their chief town was Arabia Felix, later Adana, and now *Aden*, supposed by some to be the Eden mentioned Ezek. xxvii. 23: Adana has also been identified Ophir, whither Solomon's fleet went for gold; and, doubtless, this spot must be placed somewhere on the southern coast of Arabia, but whether at Adana or among the Omanitæ cannot be decided. The supposition that Ophir was merely an emporium of Indian wares, is an answer to all the objections against this locality which are founded upon the passages, 1 Kings ix. 28; x. 11, 22. The Chatramotitæ, an important tribe, lived to the eastward; their chief town, Sabotha, the great market for frankincense, probably stood on the site of *Mareb*. The Gerrhæi on the shores of the Persian Gulf, were the great carriers of Arabia; they conveyed the merchandize of India and Southern Arabia northwards to Babylon and Thapsacus, and westward to Petra and the shores of the Mediterranean. Their chief town, Gerrha, may possibly be identical with *Katif*. The Gerrhenians, mentioned 2 Macc. xiii. 24, are not the inhabitants of this Gerrha, but of a town on the Mediterranean Sea, between Pelusium and Rhinocolura. Off the southern coast of Arabia, Dioscoridis Insula, *Socotra*, was tenanted by settlers of various countries for the sake of the valuable productions, cinnamon, &c., which were found upon it. In the Persian Gulf, Arâdus and Tylus, the *Bahrein* Islands, were famous for pearls.

## CHAPTER V.

## I. EUROPE.—II. THRACIA.—III. MŒSIA.—IV. MACEDONIA.

I. *Europe.*

EUROPE has been recognised by ancient geographers as a continent distinct from Asia and Africa, ever since the division into continents was established. The *name*, as applied to the whole continent, does not appear in any writer before Herodotus. Homer uses it for the main-land of Northern Greece, as distinct from the Peloponnesus; and, perhaps, it may be derived from the 'broad view' (εὐρύς, ὠψ), which that part of the land presented to the inhabitants of the peninsula. The boundary of Europe to the eastward, where it is contiguous to Asia, was generally fixed at the Tanais, *Don*; in early times, however, at the Phasis, *Rion*, and by Herodotus, who included Northern Asia in Europe, at the Araxes, *Aras*. In all other directions it was believed to be limited by water—viz., by the Pontus Euxinus and the Propontis, on the east; by the Mare Magnum, or Internum, on the south; by the Oceanus Atlanticus on the west; and by the Oceanus Septentrionalis on the north.

The mountain chains of Europe preserve a similar direction to those of Asia, from east to west. From the narrow strait of the Thracian Bosphorus a line of lesser heights proceeds northwards to the lofty range of Hæmus, *Balkan*, which stretches from the shore of the Euxine westward, bounding the water-basin of the Danube; it is succeeded by the ranges Scomius, Orbelus, and Scordus, which last forms the connecting link with the chain of the Bebii Montes, in the neighbourhood of the Hadriatic Sea: the range then proceeds parallel to that sea towards the north-west, and is merged in the far more important and extensive chain of the Alps, *Alps*, which sweep round from the Hadriatic to the Tuscan Sea, separating the Italian peninsula from the rest of Europe: farther westward we trace the same mountain system reappearing in the Pyrenæi Montes which separate Spain and Gaul, and traverse the former country to its western extremity.

From this series of mountains there proceed three most important offsets, (each of which becomes a secondary mountain system), forming the three peninsulas of Southern Europe. The first is emitted from the point of junction of Scordus and the Bebii Montes, and descends southwards between the Hadriatic and the Ægean seas; it was known in Northern Greece under the names of Pindus, Tymphrestus, and Parnassus; and in Peloponnesus as Artemisius, Parthenius, Taygetus, &c. The second is the Apenninus Mons, *Apennines*, which, quitting the Alps at their western extremity, traverses the centre of the Italian peninsula. The third consists of the extensive ramifications of the *Pyrenees*, which form the high peninsula of Spain: these also take a southerly direction.

The knowledge of the ancients was, until a comparatively late period, bounded northwards by the central barrier of mountains just described. At the commencement of our era, France, Germany, and Britain had been just opened by the conquests of Cæsar: the countries north of the Hæmus, Mœsia and Dacia, were not colonized by the Romans until a later period: the vast districts eastward of the *Vistula*, (*Russia, Sweden, Norway, Denmark, &c.*) which were included under the undefined title of *Sarmatia Europæa*, were almost utterly unknown.

The most important rivers of ancient Europe were, the Ister or Danubius,

*Danube*, which rises in *Abnoba Mons*, the *Black Forest*, and flows eastward in a course of 1700 miles to the *Euxine Sea*; the regularity of its direction is interrupted only once—viz., on the border of *Pannonia*, where it takes a southerly bend for some distance: the *Rhenus*, *Rhine*, which rises in *Adula Mons*, *St. Gothard*, and flows northward into the *Mare Germanicum*: the *Rhodanus*, *Rhone*, also rising in the neighbourhood of *St. Gothard*, but pursuing a direction exactly opposite to the *Rhine*, westward through the *Lacus Lemanus* to its junction with the *Arar*, *Saone*, and thence southwards to the *Mediterranean Sea*: the *Ibërus*, *Ebro*, in *Spain*, which rises in the mountains of *Cantabria*, and flows in a south-easterly direction into the *Mediterranean*: and, lastly, the *Padus*, *Po*, which rises in *Mons Vesulus*, *Monte Viso*, and receives the waters from the southern side of the *Alps*, flowing eastward through *Northern Italy* into the *Adriaticum Mare*. Other rivers there are, equal to and even exceeding these in point of size, as the *Borysthènes*, *Dnieper*; the *Vistula*; the *Albis*, *Elbe*; and the *Tagus*; but these are not noticed here, inasmuch as they do not hold a prominent position in ancient geography.

The political divisions of Europe were defined for the most part by the natural boundaries already described; they were as follow: *Thracia* and *Macedonia*, between *Hæmus* and the *Ægean Sea*; *Mœsia*, north of *Hæmus*, to the *Ister*; *Græcia*, *Illyricum*, the strip between the *Adriatic* and the *Bebii Montes*; *Italia*, the peninsula south of the *Alps*; *Hispania*; *Gallia*; *Insulæ Britannicæ*; *Germania*, between the *Rhine* and the *Vistula*; *Vindelicia*, *Rhætia*, *Noricum*, and *Pannonia*, south of the *Danube*, to the *Alps* and the *Save*; *Dacia*, north of the *Danube*, to the *Carpathian range* and the *Tyras*, *Dniester*; and *Sarmatia Europæa*, to the north of this boundary, between the *Vistula* on the west and the *Tanais* on the east, stretching to an undefined extent northwards.

## II. *Thracia*.

*Thracia* as a Roman province was bounded by the river *Nestus* on the W., *Mons Hæmus* on the N., the *Euxine Sea* and *Bosphorus* on the E., and the *Ægean Sea*, *Hellespont*, and *Propontis* on the S. Extensive mountain ranges serve as a framework to this country, and present formidable barriers to the sea: *M. Hæmus*, *Emineh Balkan*, in the north, is the highest, connecting at its western extremity with *Mons Scomius* and the ranges of the *Illyrian Alps*, and thence running in an eastern direction to the very shore of the *Euxine*; from this point it sends an offset to the south-east, skirting the coast of that sea to the mouth of the *Bosphorus*, and this again a lateral ridge to the south-west, which bounds the *Propontis* and forms the *Chersonesus*, ending in *Prom. Mastusia*, *C. Greco*. From the same point in the north-west issues the range of *Rhodöpe*, *Despoto*, forming the western boundary of *Thrace*, and distributing its lateral shoots abundantly over the western half of the country towards the east, one of which near the *Ægean* was named *Imärus*. Between the two ranges now described, flows the *Hebrus*, *Maritza*, which rises in the north-west angle, and after running for its first half course to the south-east, thence turns to the south-west, and joins the *Ægean* opposite *Samothrace*: it receives the tributary streams *Articus* from the north, and *Agriänæ*, *Erkenek*, with the *Tærus* and *Contadesus*, from the east. The *Nestus*, *Mesto*, was a less important river, rising in *Rhodope*, and flowing in a southern course into the *Ægean*, opposite *Thasos*. The small coast streams *Compsatus*, *Travus*, and *Melas* are, the first to the westward, the other two to the eastward of the *Hebrus*: the *Compsatus* flows into the *Bistônis Lacus*, the last into the *Melas Sinus*. The *Ægospotâmos* is nothing more than a brook, on the eastern side of the *Chersonesus*, flowing into the *Hellespont*. It was celebrated for the defeat of the *Athenians* by the *Spartans*, B.C. 405. The sea coast is broken up into bays and salt lakes, such as *Melas Sinus*, *Gulf of Saros*, which forms the western boundary of the *Chersonesus*: *Stentôris Lacus*, formed by an outlet of



the Hebrus: and, farther towards the west, Bistonis Lacus, *Lagos Buru*, near Abdera.

The Thracians were divided into various tribes, with local appellations; it is unnecessary to enumerate more than the following three,—the Cicōnes of Homer, who occupied the coast from the Hebrus to the Nestus; the Bessi, who held the fastnesses of Rhodōpe and Hæmus, in the north-west; and the powerful tribe of the Odrysæ, who lived about the middle course of the Hebrus.

The most important towns were—Byzantium, *Constantinople*, on the Thracian Bosphorus, founded by Milesians, B.C. 658, and very much increased by Constantine, A.D. 330, who named it after himself; Salmydessus, *Midiah*, on the coast of the Euxine; Apollonia, *Sizeboli*, higher up, also a Milesian colony, founded B.C. 650; and Mesembria, *Mesembri*, at the foot of Hæmus, founded by Byzantines, B.C. 500. On the coast of the Propontis—Selymbria, a Megarian colony, founded B.C. 675; Perinthus, *Erekli*, on a tongue of land to the westward, afterwards called Heraclea; Bisanthe, *Rhodosto*, with a good harbour; and Pactye, at the commencement of the Chersonesus. In the Chersonesus—Callipolis, *Gallipoli*, opposite Lampsacus; Sestus, *Jalova*, at the narrowest point of the strait, opposite Abydos; Elæus, at the extreme point of the peninsula, near Prom. Mastusia; and lastly, Cardia, on the western coast. On the coast of the Ægean—Ænus, *Enos*, on Lake Stentoris, mentioned as early as the Homeric age; Doriscus, a fort on the western side of the lake; and Abdëra, *Asperosa*, a colony of the Milesians, a seaport to the east of the Nestus. In the interior, the chief towns were—Hadrianopolis, *Adrianople*, on the mid-course of the Hebrus; Philippopolis, *Philippopoli*, near the source; and Trajanopolis, *Orikkora*, on the lower course of the same river.

Off the coast of Thrace lie the following islands: Thasos, *Thaso*, evidently a continuation of Mons Rhodope, celebrated for its mines of gold and marble, with a town of the same name at its northern extremity; Samothracia, *Samo-traki*, a small island opposite the mouth of the Hebrus, which, being colonized by Samians, was named, for distinction's sake, the Thracian-Samos; it was the seat of a famed temple of Cybele: Imbros, *Imbro*, and Lemnos, *Lemno*, which appear to belong to the range of high ground which forms the Chersonesus; the latter is farthest from the main land, and largest in size: it also bears a volcanic character, to which we may attribute its connexion with the fabulous history of Vulcan: it possessed two towns, Myrina, on the west, and Hephæstia, on the east coast. Both Imbros and Lemnos were occupied by Pelasgians at the time of the Persian war. These islands possessed excellent ports, especially Samothracia and Thasos.

### III. *Mæsia*.

To the north of Thrace and Macedonia lay Mæsia, stretching from Illyricum, in the W., to the Pontus Euxinus in the E., and northward to the Danube; it thus corresponds with the provinces of *Bulgaria* and *Servia*. The ranges of Hæmus, Scomius, Scordus, and Bobii Montes, which formed its southern boundary, protrude their lower ridges far towards the north, giving the southern and western districts a mountainous character, very distinct from the broad and lengthened plain through which the Danube runs in the eastern part of the province. Numerous rivers pour down from the northern declivities of these mountains to the Danube, of which the most considerable are—the Drinus, *Drinna*, which flows into the *Save*, and the Margus, *Morava*.

Mæsia was, in the time of Herodotus, inhabited by the Getæ, who afterwards crossed the Danube and settled in Dacia. The Mæsi are the same as the Mysi, of whom we have mention in Homer, a Thracian race, who settled partly on the west coast of the Euxine, and partly on the Asiatic side of the Propontis in the province of Mysia. A remnant of this people retained their distinctive name down to the time of Ptolemy, who places them about the Ciabrus, *Zibru*. Of the other kindred tribes, we shall notice the Triballi,

mentioned by Herodotus and Thucydides, who lived about the Margus, and in the high valleys of M. Scomius; the Dardäni, on the northern declivities of Scordus; the Peucini (a branch of the same people whom we afterwards find in Germany, north of the Carpathians) about the Delta of the Danube, which was called Peuce Insula; and the Scythæ, their neighbours to the west, in a district named after them, Scythia Minor.

Mœsia was incorporated into the Roman empire by Augustus, and appears as a province in the reign of Tiberius. It was divided, probably by Trajan, into two provinces; Superior, the upper or western, and Inferior, the eastern half, the river Ciabrus forming the boundary. After the withdrawal of the Romans from the province of Dacia, north of the Danube, A.D. 275, the name was transferred to Mœsia, from the Drinus to the Utus, *Wid*, with the addition of the name of the Emperor Aurelian, in whose reign the change was effected. This part was thenceforward called Dacia Aureliani, subdivided into D. Ripensis, the district along the bank of the Danube, and D. Medioterranea, the interior.

The most important towns were the Greek colonies on the shores of the Euxine, viz., Odessus and Tomis, founded by Milesians, B.C. 650; Callatis by the Pontic Heracleans, B.C. 580; and Istrus by the Milesians, B.C. 560.

#### IV. Macedonia.

The limits commonly assigned to this country represent it in the extent it attained in the time of Philip II., B.C. 359—336, when it reached the Nestus, in the E.; the range of Scordus, in the N.; in the W., the southward offset of that range which runs just east of the Lychnitis Lacus, and joins Læmon; and in the S. the Cambunian range and the Ægean Sea. Anterior to that period, however, Macedonia *proper*, as we may call it,—i.e., the territory of Macedones—was much more restricted. In the heroic age the Pæonians and the Bryges were the dominant tribes on the main land of this region, while Tyrrhenian Pelasgians occupied the peninsulas of Chalcidice. The Macedones appear to have settled first along the upper course of the Haliacmon. There they are found at the time of the Doric migration; while the rest of the country was tenanted by the Bottiæi along the coast between the Haliacmon and Axios; the Mygdones and Bisaltæ, between the Axios and Strymon; the Tyrrheno-Pelasgi, as before, in the peninsulas; and the Edones between the Strymon and Nestus; the Pæones occupying all the northern district, and the Bryges, the western border. At the time of the Persian war, Macedonia included the coast district about the head of the Thermaic Gulf with the lower valleys of the Axios and Haliacmon; Paonia still remained by far the most extensive district. Philip II. succeeded in subduing the latter region, and also in adding the territory of the Bryges, in the west, and all that lay between the Strymon and Nestus in the east, and thus gave Macedonia its full extent.

The mountain range of Hæmus, which we have traced from the Euxine to the border of Macedonia, continues its westerly direction in the north of this province under the names of Scomius and Scordus. The last connects with the Illyrian ranges of the Bebii Montes, which, descending from the north-west, continue after this junction towards the south with the names Barnus and Bora, and finally connect with the Cambunian range and Pindus in the central height of Mons Læmon. The Cambunian range forms the southern boundary of Macedonia: add to these the range of Rhodope, in the east, and we see that this province is girt on every side with strong mountain barriers except in the comparatively small space open to the Ægean sea. Offsets from these ridges separate the river courses from each other; such as M. Bermius, between the Haliacmon and the Axios; Cercine, a high and finely-timbered range between the Axios and Strymon; and on the other side of the Strymon, Orbelus, and Pangæus valuable for its gold mines. The high ground of Cercine protrudes far to the south, and forms three peninsulas—Acte, the

most easterly, with the high peak of Mount Athos, *Monte Santo*, at its extremity; Sithonia, ending in the promontories Ampelus, *C. Falso*, and Derris, *C. Drepano*; and Pallene, ending in Prom. Canastræum, *C. Paliouri*.

The courses of the rivers have been partly described along with the mountains: the Haliacmon, *Indje Kara*, rises in the south-west corner, and sweeps round in a north-easterly direction to the Thermaic Gulf: the Axios, *Wardar*, rises in the north-west, in Scordus, and flows towards the south-east, through Pæonia: it receives on its right bank the river Erigon, *Kuchuk-Karasu*, and on its left the Astycus, and falls into the Ægean at the head of the Thermaic Gulf: the Strymon, *Struma*, rises in Scomius in the north-east, and flows towards the south and south-east: near its mouth it widens into a lake, Prasias or Cercinitis, *Takinos Lake*, and falls into the bay named after it, Sinus Strymonicus. The Nestus has been already noticed. The lake Bolbe was situated between the Axios and Strymon.

The line of coast is varied by the peninsulas already noticed: on each side of them the Ægean opens into a spacious bay, the Strymonic Sinus, *Orphano Gulf*, on the east, and Thermaicus, *Sea of Saloniki*, on the west: the two lesser bays between the peninsulas were named Singiticus, *Gulf of Monte Santo*, and Toronaicus, *Gulf of Kassandra*.

The most important towns of Macedonia were—Edessa, or *Ægw, Vodina*, the old capital, in the district of Emathia; Heraclea, *Bitolia*, near the Erigon; Pella, *Atakilisseh*, the later capital and the birthplace of Alexander, situated on a lake, formed by a tributary to the Axios; Potidæa, *Pinaca*, a Corinthian colony at the neck of the peninsula of Pallene, which sustained a memorable siege against the Athenians, B.C. 432, and was afterwards destroyed by Philip, and restored by Cassander; Therma, *Saloniki*, afterwards called Thessalonica in honour of Cassander's wife, at the head of the Thermaic Gulf, the seat of a Church to which St. Paul addressed his earliest Epistle; Amphipolis on the left bank of the Strymon, about three miles from the sea, colonized by the Athenians B.C. 437, and valuable from its proximity to the hills Cercine and Pangæus; and Philippi, further eastward on a spur of Pangæus, celebrated for the defeat of the republican army, B.C. 42, and interesting to us from St. Paul's visit, and the Epistle he addressed to the Church there.

### *The Macedonian Empire.*

Philip II., on coming to the throne B.C. 359, found himself master of a small kingdom about the Thermaic gulf, and in the lower valleys of the Axios and Haliacmon. He defeated the Pæonians and Illyrians B.C. 359, and pushed his border forward to lake Lynchnitis. The following year he captured Amphipolis and the Chalcidian cities, and extended his territory to the Nestus: he crossed the Cambunian range B.C. 356, into Greece, and in the year B.C. 344 had brought Thessaly to the condition of a Macedonian province. M. Scordus and the Bebii Montes were successively traversed, and the Illyrian tribes to the Adriatic in one direction, the Thracians to the Danube and the Euxine in the other, subjected to his sway. Alexander the Great succeeded him, B.C. 336. He crossed the Hellespont 334; the battles of Granicus 334, Issus 333, and Arbela 331, put him in possession of the vast territories of the Persian empire, extending to the Iaxartes, the Oxus, and the Caspian in the north, the Indus and Paropamisus in the east, the Persian Gulf in the south, and the Ægean and Mediterranean Seas and the desert of Africa in the west. He advanced beyond the eastern boundary B.C. 327, and subdued the *Panjab*, as far as the Hyphasis, *Ghara*, which formed the extreme limit of his empire. Alexander died B.C. 323, and the dismemberment of his mighty kingdom immediately commenced. After twenty-two years of contest and intrigue between his successors, which ended with the battle of Ipsus, B.C. 301, three dynasties secured a considerable portion of the original empire—viz., the Seleucidæ in Syria, the Ptolemies in Egypt, and the

**Antigoni in Macedonia.** The latter division was by far the smallest in extent and importance, and its influence in the world was henceforward confined to Europe, and more especially to Greece. It reached its highest prosperity under the sovereignties of Demetrius, B.C. 294–287, who was in possession of Thessaly, Athens, and the greater part of Peloponnesus, and of his successor Lysimachus, B.C. 287–282, who added Thrace and parts of Asia Minor. The latter countries were wrested from Macedonia by the Gauls, B.C. 279, and its political influence in Greece gradually waned, until the final extinction of the independence of all the Grecian states by the advance of the Roman empire.

## CHAPTER VI.

### I. GRÆCIA.—II. THE ÆGÆAN ISLES AND CYPRUS.— III. ILLYRICUM.

#### I. *Græcia.*

§ 1. General description. — 2. Political divisions. — 3. Epirus. — 4. Thessalia. — 5. Acarnania. — 6. Ætolia. — 7. Doris. — 8. Locris. — 9. Phocis. — 10. Bœotia. — 11. Eubœa. — 12. Attica. — 13. Megaris. — 14. Corinthia. — 15. Sicyonia and Phliasia. — 16. Achaia. — 17. Elis. — 18. Messenia. — 19. Laconia. — 20. Argolis. — 21. Arcadia.

IT is singular that a country so isolated from the rest of Europe as the peninsula of Greece should not have received some general appellation from its own inhabitants. Such, however, is the case: the name *Græcia*, which we have adopted, was introduced by Roman writers at a late period, and probably owes its origin to the tribe of the *Graici*, with whom they first came in contact: while the name *Hellas*, commonly in use among Greek writers, is significant of *race* rather than of locality, and was variously applied to districts where the Hellenic blood and language were supposed to prevail. Thus in the heroic age, *Hellas* meant merely a district in the southern part of Thessaly—thence it spread over the whole of that province; during the flourishing period of Grecian history, it signified all northern Greece, from the Cambunian range to the Corinthian Gulf. Sometimes, indeed, it was used as inclusive of Peloponnesus and the adjacent islands, in contradistinction to all *foreign* nations; and when Philip of Macedon proved his right to sit in the Amphictyonic council, it included even Macedonia and Illyria. Hence some geographical writers have excluded Epirus, and others have included Macedonia under that title: general considerations of topography and history rather lead us to acquiesce in the usual limits assigned to it, as signifying all that lies to the south of Macedonia.

Greece is a peninsula, surrounded on three sides by water—viz., by the Ægean on the E. and S., and the Ionian sea on the W.: on the N., where it adjoins the main land of Europe, it is bounded by a barrier of hills, running from sea to sea, and thus shutting it off from easy communication with its northern neighbours. This range is connected with the mountain system of Illyria and Macedonia in the point *Læmon*, *Zygo*, which stands at the termination of the united ranges of *Scordus* and the *Bebii Montes*. From this central height—which contains the springs of the five largest rivers of Greece, the *Aōus*, the *Haliæmon*, the *Poneus*, the *Achelōus*, and the *Arachthus*, flowing in different directions—ranges diverge to the east, west, and south. The eastern branch separates Thessaly from Macedonia, under the name of *Cambunii Montes*, ending in the heights of *Olympus* which overhang the vale of *Tempe*: the western traverses the northern part of Epirus, in the ranges of *Tymphe*, *Lyneus*, and the *Ceraunii Montes*, which terminate in the bold headland of

Acroceraunium, *C. Linguetta*: the southern retains the original direction of the Illyrian range, and under the name Pindus passes down the centre of Greece, separating Thessaly from Epirus. After a course of about sixty miles, it throws out a lateral ridge to the east, named Othrys, which declines towards the neck of the Pagasæan Gulf: Pelion and Ossa form the eastern boundary of Thessaly, which is thus girt with mountains on its four sides. South of M. Othrys, the central range assumes the name Tymphrestus, and, as such, bounds Ætolia on the north: a little lower down it trends off to the south-east, with the name Ceta, bounding the valley of the Spercheius on the south, closely skirting the Malian bay, and thence continuing its course until it sinks into the plain of Boeotia, near the Copaic lake. At the point where it approaches nearest the sea, leaving but a narrow passage—the celebrated Thermopylæ—it was called Callidromos, and lower down, Cnemis, whence the Locrians, who dwelled by it, were designated Epicnemidii. Returning to the spot where it assumes a south-easterly direction, we find it again dividing: one ridge, named Corax, penetrates Ætolia and takes a south-westerly course: on the border of Locris, it was called Mycnos and Taphiassus, and it finally ends in the promontory of Antirrhium: the other ridge retains the original direction of Mount Pindus: gradually diverging from Ceta, with which it encloses, first, the triangular district of Doris, and then the broader valley of the Cephissus in Phocis, it culminates in the peaked heights of Parnassus to the north of Delphi: it reappears in Boeotia, south of lake Copais, under the name Helicon: more to the south it forms the northern boundary of Attica in the two ridges of Cithæron in the west, and Parnes in the east: and ends in the promontory of Sunium, at the extremity of the Attic peninsula.

The mountain system of Peloponnesus is connected with northern Greece by the Geranean hills of the Corinthian peninsula in the east, and by Mons Panachaicus in the west, corresponding to Corax and its continuation at point Rhium. The high land of Arcadia, with its mountain barriers, represents the heart whence the various ramifications spring. The eastern side of this country is the highest: here lie M. Cyllène, *Zyria*, on the border of Achaia, Artemisius between Mantinea and Argos, and Parthenius, *Partheni*, eastward of Tegea: south of Arcadia, the high ridge of Parnon, *Malebos*, penetrates Laconia, and terminates in Prom. Malea, *C. St. Angelo*, reappearing, however, to the south, in the island Cythra, *Cerigo*. On the western side of Arcadia there runs a range nearly parallel to that just described, assuming the names Lampœa, Pholoe, and Lycaeus, on the borders of Elis, and then separating into the ridges of Taygētus and Emathia, the former of which separates Messenia from Laconia, and ends in M. Tænarius and the promontory of Tanarium, *C. Matapan*, while the latter continues to the south, through the centre of Messenia, and ends in Prom. Acritas, *C. Gallo*. The eastern and western lines are connected by transverse ridges, Frymanthus and Cyllene in the north separating Arcadia from Achaia, and a line of inferior heights—the Nomii Montes, Boreium, and others—separating it from Messenia and Laconia.

The sea-coast of Greece varies exceedingly in character. From Olympus to the end of Pelion, it preserves an unbroken line to the south-east, without any shelter for shipping: thence a narrow passage between Eubœa and the mainland conducts to the Sinus Pagasæus, *Gulf of Volo*, which is so shut off from the sea that it bears the appearance rather of a large lake: at the neck of it was Aphêtæ, a station for vessels: westward the passage contracts, but opens again into the Sinus Maliacus, *Gulf of Zeitun*, which receives the waters of the Spercheius: the channel between Eubœa and Locris was the high road of commerce to ancient Greece, as the eastern coast of Eubœa possessed no ports, and was exposed to violent storms; off Chalcis the Euripus is so contracted that a bridge has been thrown across it both in ancient and modern times. There were various ports and roadsteads on either side of it; as Chalcis in Eubœa, Anthedon, and Aulis in Boeotia, and lower down, where the coast of Attica diverges to the south, Panormus and Thoricus. The Sinus Saronicus, *Gulf of Egina*, washes the coasts of Attica, Megaris, and Argolis, and on all

sides affords excellent accommodation for maritime pursuits: Athens possessed three ports — Piræus, Phalerum, and Munychia; Salamis, a splendid bay; Megaris, the port of Nisæa; the Corinthian territory, Cenchreæ; and Argolis, Epidaurus, and the roadslead of Troezen. In addition to this, the Saronic and the Corinthian gulfs approach so near, that vessels were drawn across the intermediate isthmus, and thus avoided the dangers of Malea and Tenarus. The south-eastern coast of Argolis is beset with islands, Hydræa and others, which rendered navigation perilous. The Argolicus Sinus, *Gulf of Nauplia*, supplied Argos with every advantage, from its sheltered position and its numerous bays. From Argolis the coast slopes off towards Prom. Malea, and presents only one shipping-station along the coast of Laconia, viz., Epidaurus Limera. The projecting ranges of Southern Greece, Parnon and Taygetus, admit the Laconicus Sinus, *Gulf of Kolokythi*, and the Messenic Sinus, *Gulf of Koroni*, deeply into the interior; there were, however, few ports of any consequence in them; Gythium and Achillæus Portus in Laconia, and Corone in Messenia, were all indifferent, while the storms and currents that prevail about the promontories indisposed the Greeks from venturing too much on those seas. The western coast is more regular than the others: from Prom. Acritas to Prom. Hyrmina, *Tornese*, it bears away to the north-west, opening into the Sinus Cyparissius, *Gulf of Arcadia*, and Sinus Chelonates, and affording in this part the ports of Pylos, *Navarino*, and Cyparissia: northward of Prom. Hyrmina, it takes a north-easterly direction to Prom. Araxum, *C. Papas*, and on this side offers only one good harbour, that of Cyllene, in the bay of the same name.

The Sinus Corinthiacus almost separates Peloponnesus from the rest of Greece: it commenced with the promontory of Araxum, and in this, its western portion, now the *Gulf of Patras*, it offers the ports of Patræ in Achaia, and Chalcis in Ætolia: eastward of Patræ, the channel is narrowed by the advancing headlands Rhium and Antirrhium, and thence opens into a spacious bay, *Gulf of Lepanto*, towards the south-east, gradually increasing its breadth, until at its eastern extremity it is divided into two lesser bays, the northern of which was called Marc Alecyonium, the southern, the bay of Lechæum. The northern coast of the Corinthian Gulf possesses the best harbours—Naupactus in Locris, Cirrha in Phocis, and Creusa in Boeotia: on the eastern coast, the Megarians had their port of Pagæ, and the Corinthians, Lechæum: the ports on the southern coast, Sicyon, Helice, and Ægium were poor, and little frequented. Returning to the neck of the Corinthian Gulf, we find the western coast preserving a generally uniform direction to the north-west: in the neighbourhood of Acarnania it is beset with numerous islands, Leucadia, Ithaca, &c., which rendered regular navigation dangerous, but at the same time covered the ports on the main land, and adapted them for piratical purposes. The only inlet of any importance is the Sinus Ambracius, *Gulf of Arta*, which connects with the sea by a very narrow channel, commanded by the projecting ground on which Actium stood; it opens into a spacious and irregular sheet of water, abounding with creeks and bays, very favourable to ancient navigation and colonization. To the north of the Sinus Ambracius, almost the only object of importance is the large island of Coreÿra, *Corfu*: on the mainland were good roadsteads, such as Portus Glycys, and Panormus, little noticed by classical writers.

2 The next subject of importance in the geography of Greece is its political and territorial divisions. The ancient traditions of the country speak of two distinct races, the Pelasgi and the Hellenes, as forming at different times the dominant tribes of Greece, the former in the heroic, the latter in the historical age. The Pelasgi were deemed the original inhabitants: the Hellenes an immigrant conquering tribe. It is, however, the opinion of some that these were not distinct races, but that the Hellenes were a superior and more cultivated branch of the older Pelasgic stock. Supposing this, it is still desirable to keep up the distinction between the Pelasgic and Hellenic eras, as representing different stages of history and civilization.

Again, the Greek writers were in the habit of distinguishing between the Pelasgi and various other tribes, as the Caucones, Leleges, &c. These tribes are now recognised not as distinct from, but subdivisions of, the Pelasgic family, so that the name Pelasgi may be deemed a 'general one, like that of the Saxons, Franks, or Alemanni.\*

In the Pelasgic period from B.C. 1700 to 1500, the tribes were distributed as follow:—the Pelasgi (properly so called) in Arcadia, Argos, and Achaia: the Leleges in the south of Peloponnesus, (Messenia, and Laconia,) and also to the north of the Corinthian Gulf in Ætolia, Locris, and Phocis: the Caucones in Elis and Western Messenia; the Curetes in Acarnania; the Dryopes north of the Ambracian Gulf, and in later Doris; the Dolopes in Mount Pindus; the Chaones south of the Acroceraunian range; and the Thesproti and Molossi in central Epirus. Towards the latter part of this period, the Hellenic race seems to have been dispersed about Northern Greece as follows:—the Hellenes and Achæi in Epirus, near Dodona; the Minyans, Phlegyans, and Æolians, on the border of Macedonia; and the Dorians, near Mount Olympus.

The Heroic or early Hellenic period, B.C. 1500—1100, is marked by the great advance of the Hellenic tribes. They had crossed the Pindus, expelled the Pelasgi from the valley of the Peneus, and had established themselves in the central and southern parts of Thessaly; the Achæans were settled to the westward of the Pagasæan Gulf, which became the original Hellas; the Æolians, and a tribe connected with them, the Bœotians, held the central plain. The Dorians had descended from their mountain quarters, and had expelled the Dryopes from the upper valley of the Cephissus; the Æolians occupied the later provinces of Phocis, Acarnania, and Bœotia, and the west coast of Peloponnesus; the Ionians, the northern parts of the Peloponnesus; and the Achæans, the districts afterwards called Laconia, Messenia, and Argolis. The older occupants were either thrust back from the maritime districts to the interior, or else took refuge on isolated headlands and peninsulas. Thus the Pelasgi continued to hold Arcadia, the southern points of Messenia and Laconia, the north-east angle of Elis, and the interior mountainous districts of Ætolia and Phocis.

The latter part of the twelfth century, B.C., witnessed a great and a permanent change in the population of Greece. About 1124 the Thessali, probably a Pelasgic race, crossed the Pindus, expelled the Bœotians and Æolians, and occupied their country, which afterwards took its name from them. The Bœotians in turn dispossessed the Æolian settlers of the valley of the Cephissus and the plains south of the lake Copais, and gave the name Bœotia to their new territory. The expelled Æolians, together with other refugees, emigrated to the coast of Asia Minor and other places. Twenty years later, B.C. 1104, the Dorians descended southwards across the neck of the Corinthian Gulf into Peloponnesus; they conquered Laconia, Messenia, Argos, and Corinth. The Achæans, who had formerly occupied these provinces, retired for the most part to the north of Peloponnesus, and settled in the maritime district named after them Achaia: some, however, remained in the southern district of Laconia, and in the upper part of Argolis. The Ionians, dispossessed of Achaia, and not finding room in Attica, sought new quarters in Asia Minor. The Æolian branch of the Hellenes held their ground to the north of the Corinthian Gulf, in Ætolia and Locris, and in western Peloponnesus, where, under the name of Epeans, they occupied Elis, and as Minyans, the small district of Triphylia. The Pelasgic population remained undisturbed in Arcadia: in other parts they either took refuge in the Ægean islands or became merged in the dominant Hellenic race.

After this time the abodes of the races underwent little change, and Greece was henceforward subdivided into districts, the limits of which were partly fixed by geographical features, partly by the occupation of races. Of

\* Bishop Thirlwall's *Greece*, vol. i. p. 41.

these districts, there were in Greece, north of the Peloponnesus, the following ten:—Epirus, Thessaly, Acarnania, Ætolia, Locris, Phocis, Doris, Bœotia, Attica, and Megaris; and in the Peloponnesus the following nine:—Achaia, Argolis, Laconia, Messenia, Elis, Arcadia, Corinthia, Sicyonia, and Phliasia.

3 EPIRUS, the north-westerly province of Greece, was bounded on the N. by the Ceraunian range, on the E. by Pindus, on the S. by the Ambracian Gulf, and on the W. by the Adriatic Sea. The name Epirus signifies *mainland*, and was first applied to it by the inhabitants of the adjacent islands, Coreyra, Ithaca, &c.

The general character of this province is wild and mountainous, with valleys widening out into extensive and fertile plains as they approach the sea. The rivers flow for the most part to the south-west; the most important are—the Achelous, *Aspro-potamo*, in the eastern part of the province, which exceeds all the other rivers of Greece in size and length; it rises in Laemon, and in its upper course flows along a valley on the western side of Pindus: the Arachthus, *Arta*, flowing into the Ambracian Gulf: the Achëron, *Souli*, so celebrated in mythical representations of the infernal regions, on the west coast, a river of no great size flowing along a valley of wild and sombre character, and discharging itself into a small bay, Portus Glykys, *Glyki*; and in the northern district, the important Aôus, *Boiussa*, which, unlike the others, flows towards the north-west, and receives tributaries from the northern declivities of Lynceus and the Ceraunian ranges.

Epirus was occupied by a variety of tribes, differing in race, and until a very late period of ancient history, independent of each other. Three, however, surpassed the rest in importance, the Chaones in the north-west, the Thesproti in the south-west, and the Molossi in the interior. Under the reigns of Alexander and Pyrrhus, Molossian kings, the Epirote tribes seem to have been united in one kingdom. The Chaones occupied the coast from the Ceraunian range to the river Thyamis; their chief towns were—Buthrotum, *Butrinto*, opposite the northern point of Coreyra: Palæste, *Pallassa*, on the sea-coast under the Ceraunian mountains: in the interior, Phœnice, near *Delvino*, north-east of Buthrotum: and Phanôte, *Gardiki*, yet more to the north. In the valley of the Aous dwelt the Atintanes and the Paravæi, the latter north, the former south of the river; and the Tymphæi about its sources, and even over the ridge of Pindus to the head-waters of the Peneus. The Aous was hemmed in in its mid-course by the approaching ridges of Aeropus and Asnaus, which formed an important defile, Aoi Stena, near *Clissura*.

Thesprotia lay between the Thyamis and the Achëron, and possessed the towns of Pandosia and the Homeric Ephÿre, near the latter river. Between the Achëron and the Ambracian Gulf lived the Cassiopæi. In later times, Augustus built at the extreme southern point of this district the town Nicopolis, *Prevesa Vecchia*, in memory of his victory at Actium.

Molossis extended inland from the borders of Chaonia and Thesprotia to the ridge of Pindus. The most celebrated spot in this district was Dodôna, the seat of the most ancient oracle of Greece. Its site cannot be ascertained with any certainty: it is now generally placed at the southern extremity of the lake Pambôtis, *Janina*. Eastward of Molossis, in the upper valley of the Achelous, lived the Athamânes, who became of much importance in the Roman wars, as they commanded the passes between Thessaly and Ætolia, and possessed forts on either side of the Pindus. The town Argitheia was probably situated on the Achelous: of the rest, nothing more than the names is known.

There yet remains to be noticed, the territory of Ambracia, to the north of the gulf of that name. Ambracia itself, *Arta*, founded by Corinthians, was most favourably situated in a broad plain on the banks of the Arachthus, some few miles from the gulf: a steep hill, crowned with a citadel, commanded the town. The trade of Epirus would naturally pass through it, and thus it obtained great maritime importance in the time of the Peloponnesian war.



Off the coast of Epirus lay the island of Corcÿra, *Corfu*, the Scheria of Homer, and in his age the residence of the Phæacians. It is said to have been also called *Dropanë* from its resemblance to a *reaping-hook*. It is remarkable for its beauty and fertility, and historically famous for its connexion with the Peloponnesian war. The mountain chains which traverse it everywhere run out into four headlands;—viz., Cassiöpe, in the north-east, *Point St. Catherine*; ~~Phalacrum~~, in the north-west, *Drasti*; Amphipägus, the extreme southern point, *C. Bianco*; and Leucimna, on the south-east coast, *Cape Lechino*. The town of Corcÿra was situated on the eastern coast, and thus opposite the mainland, where the modern town now stands. It was colonized by Corinthians, B.C. 758, and stood just at the neck of a small peninsula, formed by two inlets of the sea, which afforded it a double harbour, the southern one of which, named the Hylläic harbour, is now the lagune of *Calichiopoulo*. Opposite the northern harbour lay the small island of Ptychia; and between the southern point of Corcÿra and the mainland, Syböta.

4 THESSALIA adjoined Epirus on the E. It was bounded by the Cambunian range on the N., Pindus on the W., Cÿta on the S., and the Ægean Sea on the E. These limits embrace the valley of the Spercheius and the Malian territory to the south, as well as Magnesia to the east. The name Thessalia is of comparatively late date—it does not appear in Homer: perhaps it may be regarded as an extended use of the name of the *district* Thessaliötis, with a slight change in the form of the word.

Thessaly *proper* (to the exclusion of Magnesia and Malis) consists of an extensive plain, hedged in on every side with high mountain-barriers, and bearing a close resemblance to the dry bed of a lake. To all appearance the waters, which now find an issue by the valley of Tempe, stagnated here, and formed an inland sea, connected with the Lake Bœbeis and the Pagasæan Gulf. The plain is traversed by five large and several smaller streams, viz.—the Apidänus with its tributaries, the Enipeus and Cuarius, from the south; the Pamïsus from the west; the Peneus with its tributary, the Ion, from the north-west; and the Lethæus and Titaresius from the north. The four first unite in the western part of the plain, and the Titaresius lower down; and the united waters, with the name Peneus, *Salambria*, flow towards the north-east, through the vale of Tempe, into the Thermaic Gulf. The vale is about five miles in length, and in places so narrow that there is room only for the river and the road, above which the rocks rise precipitously to a great height: the road ran along the *right* bank of the river. This afforded the readiest access from the north into Thessaly; but it was not the only entrance: sometimes the pass was altogether avoided by a route to the north of Tempe, which struck off from Gonnos, and skirted the base of Olympus by the Lake *Ascuris*, descending into the plain opposite Heracleum. There was also a well-frequented route over the Cambunian range, which followed the course of the Titaresius, and dividing near Doliche, led either westward towards Elymiotis, or eastward by Pythium and Petra to Pieria: the former was called the Volustana Via. On the side of Epirus, Thessaly was accessible by two routes, one of which followed the course of the Peneus to the heights of Læmon, and descended to the Arachthus and the interior of Epirus; the other, more to the south, left the valley of the Peneus at Tricca, and crossed by Gomphi into Athamania, thus communicating more directly with Ambracia and Ætolia. The fortress of Æginium, *Kalabaka*, commanded the first, and Gomphi the second.

Thessaly is generally said to have been divided into four districts—Hestiasötis, Thessaliötis, Pelasgiotis, and Phthiotis. But this division is neither co-extensive with the limits of the country, nor does it appear to have been universally accepted by ancient writers. To these we must add, at all events, Magnesia, Dolopia, Cÿtæa, and Malis, if, indeed, we ought not also to consider the district of the Perrhæbi as a distinct division.

Hestiasotis lay to the west, under Mount Pindus, and about the upper valley of the Peneus: besides Æginium and Gomphi, which have been

already mentioned as commanding the passes of Pindus, it possessed the towns—*Tricca*, *Trikhalæ*, on the left bank of the Lethæus; the Homeric towns of Ithôme and Cechalia, the latter north of *Tricca*, the former eastward of Gomphi; *Pelinna*, north-east of *Tricca*; and *Molibœa*, still more to the north.

*Pelasgiotis* lay towards the north-east of the province on both sides of the *Peneus*: the district north of the river to the Cambunian mountains was occupied by the *Perrhæbi*, and hence is frequently called *Perrhæbia*: their chief residence appears to have been on the banks of the *Titaresius* or *Eurôtas*, *Saranta Poros*. This tribe commanded the important passes into Macedonia already mentioned. Not far from the head of the valley, they possessed three towns, or forts (whence the mountain district was called *Tripolis*), *Azōrus*, *Dolîche*, and *Pythium*, the latter nearest to *Olympus*, and on the route which *Xerxes*, *Brasidas*, and others took across these mountains. Descending the valley of the *Titaresius*, we come to the towns *Eritium* on the left, *Mallœa*, *Mylæ*, and *Metropolis* on the right bank. The important town of *Gyrton*, *Titari*, was situated between the *Titaresius* and *Peneus*, on the road from *Larissa* to the pass. In the valley of the *Peneus* lay—*Phacium*, on the border of *Hestiamotis*; *Larissa*, which still retains its name, on the right bank, probably identical with the *Argos Pelasgiæum* of *Homer*, at all events an old *Pelasgian* town, as its name indicates; its citadel was strongly posted on a hill, and it was an important point in the time of the Macedonian wars: *Gonnus*, at the western entrance to the defile of *Tempe*, on the left bank; and *Lapathus* somewhat off to the left on the mountain track to *Heracleum*. To the south of the *Peneus* lay—*Crannon*, the same as *Homer's* *Ephyra*, south-west of *Larissa*, the seat of the *Scopadæ*: *Scotussa*, at the source of the river *Onchestus*; and in its immediate neighbourhood the two hills named *Cynosephâlæ*, the scene of the Roman victory over *Philip* of *Macedon*, 197 B.C. These hills are at the extremity of the high ground which separates the lake *Bœbeis* from the *Pagasæan* Gulf: the lake is now named *Carlas*. *Phæræ*, *Velestina*, one of the most ancient towns of *Thessaly*, was beautifully situated to the north-west of the *Pagasæan* gulf: the fountains of *Hyperea* and *Messeis* lay in its vicinity.

*Magnesia* was the mountainous strip to the eastward of the lake *Bœbeis* from *Tempe* to the promontory of *Sepias*, which is traversed by the ridges of *Ossa*, *Kissoco*, and *Pelion*, *Zagora*. Prom. *Sepias*, *C. St. George*, was the spot fatal to the Persian fleet. The most important town in this district was *Demetrias*, founded by *Demetrius Polioretæ*, B.C. 290, on the north-east point of the *Pagasæan* Gulf, justly termed one of the *Jefters of Greece*, as it commanded the road to *Thessaly*: it was situated on the high ground of *Goritzæ*. A mile to the north was the old city *Iolehos*, the birth-place of *Jason*; and just at the head of the gulf, its port *Pagæsæ*, where *Volo* now stands: *Aphîtæ* lay at the neck of the gulf.

*Phthiotis* lay to the west of the *Pagasæan* Gulf, in the angle formed by that and the *Malian* bay, stretching back thence to *Dolopia*. The range of *Othrys* penetrates this district, dividing it into two unequal parts, the southern one of which was named *Lamieis* after the town of *Lamia*. In *Phthiotis* lay the original *Hellas*; the position of it, whether we regard it as the name of a town or a district, was on the banks of the *Enipeus*, south of *Pharsalus*, and close by the more modern *Melitæa*. The chief towns were *Thebæ* *Phthiotides*, south of *Phæræ*, not far from the sea and on the great *Thessalian* road: *Halus* on the stream *Amphryssus*, *Armiro*, also near the sea: *Pteleum*, *Ptelio*, on the coast opposite *Aphetæ*: *Larissa* *Cremaste*, the latter part of the name indicating the steepness of its situation, a *Pelasgic* town opposite *Eubœa*; *Alôpe* somewhat to the westward; and *Phalæra*, *Stylida*, the port of *Lamia*. In the interior, were *Melitæa*, north of *Othrys* and on the left bank of the *Enipeus*, whence a mountain track led to *Lamia* across *Othrys*: *Thaumæci*, *Dhomoko*, an important fortress commanding the road just mentioned, on a spur of *Othrys* to the north-west of *Melitæa*: *Phylææ*, between *Melitæa* and

Thebes: Eretria, between Thebes and Pharsalus: and lastly, *Lamia*, *Zeitun*, near the western extremity of the Malian bay, the chief seat of the war between the Macedonians and Athenians.

Thessaliotis, was the district north-west of Phthiotis to the Peneus, watered by the rivers Enipeus, Cuarius, and Phœnix. Its chief towns were Metropolis, to the south-east of Gomphi: Cierium, the ancient Arne, on the road between Gomphi and Crannon; and Pharsalus, *Phersala*, famed for the contest between Cæsar and Pompey, B.C. 48, a short distance from the Enipeus.

Dolopia was the south-west district of Thessaly. It consisted of the highlands on each side of M. Pindus to its junction with Tymphrestus and Othrys, whence flow tributaries to the Achelous, the Spercheius, and the Peneus. The position of this land midway between Ætolia and Thessaly will account for its having been the scene of operations during the Ætolian wars. It was occupied by the remnant of the Pelasgian Dolopes and Dryopes, who retreated thither on the advance of the Hellenes. The names of several towns are mentioned by Livy; but their positions are uncertain, and the only one of which we have any particulars, is Ctimene or Cymine.

From the southern part of Dolopia, the land declines towards the valley of the Spercheius, *Hellada*, which commences at the point where Othrys and Ceta part, and gradually increases with the divergence of these ranges, until it is closed by the Malian Gulf. This valley, in length about sixty miles, is equally celebrated for its beauty and its fertility. The upper half was occupied by the Ænians, and called Æniania, or sometimes Cetaea, with only one town of any importance, Hypæta, *Patradjik*, on the route that led across Tymphrestus to Ætolia. The lower valley was occupied by the Malians, a Dorian tribe, with the town Heraclæa Trachinia, founded by the Lacedæmonians, B.C. 426, for the defence of their allies, the Trachinians, against the Cetaeans; it was situated about two miles and a half from the sea, just below Mount Ceta, on a spur of which stood the citadel. The old city of Trachis lay less than a mile off to the west; and Anticyra, near the mouth of the Spercheius. The outlet of this country towards Locris was guarded by the famed pass of Thermopylæ. The coast has advanced so much, through the copious deposits of alluvial soil that the Spercheius has brought down, that the pass no longer exists. In the time of the Persian war, an advanced ridge of Ceta, named Callidromos, pressed close upon the sea, leaving a passage about fifty feet wide, which was defended by an artificial wall, built by the Phocians. At the entrance of the pass, on the Melian side, stood the village of Anthela, and on the Locrian side Alpænus; in the narrowest spot between these two towns, were the Phocian wall and the hot springs whence the place derived its name. The path Anopæa, by which the Persians arrived at the Locrian end of the pass, followed the course of the Asopus to the foot of Ceta, and thence over Callidromos to Alpenus.

A group of islands lay off the coast of Thessaly, apparently a continuation of the mountain range of Magnesia—Seyâthos, which retains its name; Halonæus, or Scopelos, *Scopelo*; Peparæthus, *Khelidromi*, or, as some think, *Piperi*; and Seyros, *Skyro*. These islands were occupied by Pelasgi and Dolopes.

5 ACARNANIA was bounded on the W. by the Ionian Sea, and on the N.W. by the Amphilocheian Gulf; towards the E. the Achelous separated it from Ætolia, except where a portion of the latter province, called Ætolia Adjecta, crossed the river in the neighbourhood of the Ambracian Gulf. The territory of Argos Amphilocheium to the east of the gulf, and sometimes also Ambracia (which has been described in this work as part of Epirus) are reckoned as parts of Acarnania.

Acarnania is intersected with well-wooded mountains, inferior in height to the central ranges of Greece. Some few of these received specific names, as Thyamus, which separated it from Ætolia Adjecta, and Crania, between the

territories of Argos and Ambracia. Between the hills are spacious plains, (such as that in the neighbourhood of Stratus,) and some few lakes.

The Achelous, *Aspro-potamo*, brought down vast quantities of alluvial soil, so much so that it formed a district near its mouth, named Paracholois, and enclosed some of a group of islands, the Cēniadæ, which formerly lay at some distance from the main land. It receives two tributaries on its right bank, the Petitārus, which rises in Amphiloehia, and the Anāpus, to the south of Stratus.

Acarnania never attained any great political importance; the native tribes lived chiefly in scattered villages, and the towns which lined the coast were the property of other Greek states. The most celebrated spot in history is the promontory of Actium, *Punta*, at the neck of the Ambracian Gulf, the scene of the victory of Augustus over Antony, B.C. 31. The towns worthy of mention were—Anactorium, *Aios Petros*, eastward of Actium, colonized by Corinthians: Limnaea, *Kervasara*, at the south-east point of the gulf, the spot whence expeditions were more than once commenced against Ætolia and Acarnania: Argos Amphilocheium, *Neochori*, of Argive origin, advantageously situated on an elevation on the eastern coast of the gulf: Olpæ, to the north of it, and Idomœne, on the borders of Ambracia: Stratus, *Lepenu*, the metropolis, on the right bank of the Achelous: Phytia, *Porta*, west of Stratus: Medeon, *Catouna*, a considerable place, to the north of Phytia: Cēniadæ, *Trikardo*, near the mouth of the Achelous, rendered almost impregnable through the marshes which surrounded it; and on the west coast, Astæus, *Dragomestre*, and Solium, a Corinthian settlement opposite Leucas.

Closely connected with Acarnania was the island of Leucas, *Santa Maura*, which, indeed, until a late period had formed a peninsula of the main land: it was separated from it by an artificial cut, originally constructed by the Corinthian colonists for the purpose of defence: in the time of the Peloponnesian war, this canal was choked up with sand, but was afterwards reopened. The southern extremity of the island was the celebrated Prom. Leucæte, *C. Dukato*, now an insulated rock, crowned with a temple sacred to Apollo, and well known as the scene of Sappho's leap. The island possessed three towns—Leucas, near *Amazidhi*, on the Dioryctus or canal, a Corinthian colony; Hellomînium, probably the same as Phlæa, in the south: and Clymênium, on the east coast. The old Homeric town, Neræus, stood at the northern extremity of the island. Between Leucas and the main land lies the group, Insulæ Taphiorum or Teleboarum, the principal one of which was called Taphos *Meganasi*. South of Leucas is situated the small but celebrated island of Ithæca, *Thiaki*; it consists of a double peninsula, the northern formed by the ridge Neriton, the southern by Neion, separated by a bay on the eastern coast, named Rheithrum; on the ridge that connected the peninsulas, not far from the present town *Bathy*, the Homeric town Ithaca is supposed to have stood; the port of Phœreys was probably on the north coast; Mons Corax formed the north-west point. Between Ithaca and Cephallenia, which were only three miles distant, lay the small island of Astêris, *Dascaglio*. Cephallenia, *Cephalonia*, called in Homer Same and Samos, is the largest island on this coast. Like the others it is a collection of rocks, the highest of which, in the south, received the name of Ænus. It contained four cities—Proni, on the south-east coast; Same, the capital, on the strait opposite Ithaca, strongly defended by a double citadel; Cranii, *Argostoli*, on the south-western coast; and on the western side of a deep inlet, Pale, *Lixuri*, which furnished a contingent for the battle of Plataea, and probably was at that time the most powerful of the four. The most southerly of the group was Zacynthus, *Zante*, a very fertile, and in ancient times a very well-wooded island. Its position with respect to Peloponnesus made its acquisition of great importance in all the Greek wars. The capital town, Zacynthus, was on the same site as the modern *Zante*, looking towards the Peloponnesus; near it rose the heights of Elâtus, *Mount Scopo*. It now only remains for us to notice the Echinâdes, *Kurzolari*

*Islands*, off the mouth of the Achelous, the chief of which, the Homeric Dulichium, has been connected with the main land by the deposits of that river.

6 **ÆTOLIA** was bounded on the west by the Achelous, and on the N. and N.E. by the ranges of Tymphrestus and Cēta; on the E. by Corax and Myenus, dividing it from Locris; and on the S. by the Messenian Gulf.

It is generally, but especially in the northern districts, mountainous and rugged; along the sea-shore, however, there stretches a broad and fertile alluvial plain, which was crossed by the road from Acarnania to Naupactus and Corinth. Ætolia was divided into two districts, geographically distinct: Ætolia Antiqua or Propria, south of Mons Panætolum; and the northern Highlands, Ætolia Epictētus or Adjecta, i. e., *added or acquired in addition* to the country properly so called. The only mountain range in the interior of Ætolia was Panætolum, just mentioned, which crosses in a north-westerly direction the ground between the valleys of the Evenus and Achelous: it derived its name from the meetings of the confederate Ætolian tribes having been held at Thermum, a town at the base of the ridge; it is now called *Viena*. There were only two rivers of any size, the Achelous in the west, and the Evenus, *Fidari*, in the east: the Achelous is increased by a tributary, the Campylus, on its left bank, and also by the surplus water of two considerable lakes, named Trichonis, *Brakhori*, and Hyria or Lysimachia, which lie in the hollow between Aracynthus and Panætolum, and discharge themselves into the Achelous by the river Cyäthus, *Neschio*.

There are but few towns in Ætolia, and these mostly on the sea-coast: the tribes of the interior were dispersed about in villages. Entering from Acarnania, we come to Pleuron Nova, *Castro of Irene*, at the foot of Mons Aracynthus: Calydon, *Kartaga*, in the valley of the Evenus; and Chalcis on the sea, near the border of Locris. In the interior were Conōpe, afterwards Arsinoe, near the outlet of the Cyäthus into the Achelous; Lysimachia, *Papadhates*, south of the lake Hyria; and Thermum, the ancient capital and arsenal of Ætolia, to the north of Lake Trichonis. Metäpa seems to have been situated just to the north-west of Lake Trichonis.

Ætolia Adjecta was occupied by several half-civilized tribes, of which the best known were—the Eurytānes, about the declivities of Tymphrestus and Cēta; the Apodōti, about the mid valleys of the Evenus and Hylæthus; and the Ophionenses, in the upper valley of the Evenus. There were besides the following lesser tribes—the Bomienses, with their town Bomi, who lived about the sources of the Evenus; the Callienses, with the town Callium, on the eastern side of Mount Corax; the Agræi, west of the Eurytanes, between the Campylus and Achelous, with the town Ephÿra on the former river; and the Aperantes, lower down in the valley of the Achelous, with the towns Aperantia, *Preventza*, and Agrinium, to the eastward. The towns of Ægitium, Potidania, and others, which Demosthenes reached in his Ætolian expedition, were on the banks of the Hylæthus. Cēthalia, belonging to the Eurytanes, lay, probably, close under Tymphrestus.

7 **DORIS**.—The small and rugged mountain district which was regarded as the cradle of the Dorian nation, lay at the head of the valley of Cephissus, where the ranges of Cēta and Parnassus converge and ultimately unite. The stream which carries off the waters from these hills was named the Pindus, *Apostolia*, and joins the Cephissus in Phocis: on its banks were built the four cities that constituted the Dorian Tetropolis, viz.: Pindus, near the source of the river; Erineus, lower down on the left bank; Cytinium, *Gravia*, on the right bank, the most considerable of the four; and lastly, Böum, also on the right bank, to the south-east of Cytinium. A road from Amphissa in Locris crossed the valley of the Pindus at Cytinium for Heraclea in Trachis.

8 **LOCRI**.—The Locrians occupied two distinct districts, separated by the valley of the Cephissus and the provinces of Doris and Phocis. On the western side of Parnassus, and thence to the Corinthian Gulf, lived the Locri Ozōlä, and on the east of Cēta, in the narrow strip that intervenes between it and the sea, the two other divisions, the Epionemidii and Opuntii. The origin of the

two latter names is clear: the one is derived from Mount Cnemis, a continuation of Ceta, the other from the town Opus: the derivation of Ozolæ is not so well ascertained: it is usually connected with the Greek word ὀζέω, 'to smell,' which may have referred either to some strong-smelling plant that abounded there, or to the goatskins in which the Locrians dressed. We shall describe the territory of the Ozolæ first: they occupied the coast of the Corinthian Gulf, from the promontory Antirrhium in the west, to the Crissæan bay in the east: inland their territory was circumscribed by the ranges of Parnassus in the north-east, and Corax and Myenus in the north-west. The only river in this province is the Hylæthus, *Morno*, which follows the course of Mons Myenus to the south-west, and flows into the Corinthian Gulf. The general character of the country is mountainous.

The first town, entering by the coast road from Ætolia, was Molycrium or Molyeria, sometimes reckoned as belonging to Ætolia: it lay a little westward of the promontory Antirrhium. At this point the Corinthian Gulf is contracted to the breadth of about a mile: in ancient times a temple of Neptune, and now a fortress stands on either side: that at Antirrhium is called *Roumelia*. Eastward of Antirrhium, stood Naupactus, *Lepanto*, whence the gulf takes its modern name; the Athenians established the Messenians of Ithome here after the Persian war, and derived important advantages from this acquisition in their attacks upon Ætolia: the port was well defended, being actually inside the walls of the city. Cænium, *Magula*, was situated eastward: and farther along the coast, the unimportant towns of Anticyrrha, Erythræ, Tolôphon, and Ceanthe. The most celebrated town belonging to the Locri Ozolæ was Amphissa, *Salona*, at the head of the Crissæan plain. The citadel stood on an impregnable rock, which commanded the road from the north and west to Delphi. It was destroyed by order of the Amphictyonic Council, because its inhabitants cultivated the sacred plain of Crissa; but it seems to have been restored shortly after.

The confined district of the Locri Epimenidii commenced at the pass of Thermopylæ, and followed the sea-coast to the south-east, as far as the town of Alopec. The Malian Gulf recedes considerably from the range of Cnemis between these points, leaving a maritime plain in the neighbourhood of Scarpheia. The great northern road followed the sea-coast; but this district was also accessible from Phocis by two routes over Mount Cnemis, which passed through the towns of Tarphe and Thronium. With the exception of the plain already referred to, the district was broken up by spurs of Mount Cnemis.

The towns (commencing from the north, and following the main road,) were—Alpœnus or Alponus at the entrance of Thermopylæ; Nicœa immediately on the sea-coast; Scarphe or Scarpheia, about a mile and a half inland; Cnemis or Cnemides, by the promontory of the same name; and Daphnus, near *Neokhorio*. Inland were Thronium, *Romani*, the capital, on the Boagrius, strongly situated on a spur of Cnemis; and Tarphe to the westward, close under the main ridge.

The Locri Opuntii occupied the coast southward to the town Larymna, where an inlet of the Eubœan sea approached so near the Copaic lake, as to form a natural boundary. In general character, this district assimilates to Epimenidia: the coast, however, protrudes *inwards* instead of outwards, and confines the plain of Opus on the east. The hills gradually decline towards the south-east; and from Opus, the main road struck across the range into the plain of Bœotia.

The chief towns in Opuntia were—Alopec; Cynus, *Libanitis*, a seaport at the northern commencement of the Opuntian bay; Opus, *Kardhenitza*, the capital, about two miles from the sea; and Larymna, *Kastri*.

Off the coast, in the Opuntian bay, lies the island of Atalanta, the modern name of which, *Talanta*, gives the title to the adjacent main land; it was occupied by the Athenians during the Peloponnesian war.

9 PHOCIS lay between the divisions of Locris. In shape it resembled an

irregular quadrangle, the Corinthian Gulf forming the base, and Cnemis the upper side; on the E. it was contiguous to Boeotia, and on the W. to Doris and the Locri Ozolæ. It was unequally divided by the range of Parnassus into two districts, totally distinct in character and in historical associations, the northern consisting of the rich and broad valley of the Cephissus, the southern of Delphi and its neighbourhood. The name of Parnassus is sometimes applied to the range, sometimes to the highest points of the range: to these, however, specific names were also given, the central double peak being called *Lycoræa*, and still *Liakura*, and the northern height above Neon, *Tithoræa*, *Velitza*. The former contains numerous stalactite caves, of which the *Corycium Antrum*, above Delphi, was the most celebrated. The summit, generally covered with snow, and the rugged and precipitous sides of this mountain, form the most conspicuous feature in the landscape of central Greece. The chief river is the Cephissus, *Mavro-potamo*, which rises near *Lilæa* in the western part of the province, is joined at a short distance from its source by the *Pindus*, and thence flows to the south-east through a valley, generally wide, but contracted to a narrow pass on the confines of Boeotia.

The chief towns in the northern district were—*Lilæa*, *Palæo-kastro*, on the declivities of Parnassus, near the source of the Cephissus; *Elatea*, *Lefta*, on M. Cnemis, which commanded the pass over that mountain from Locris, and therefore formed 'the key of southern Greece'; *Parapotamii*, *Belësh*, on the river side, as its name implies, at the entrance of the pass into Boeotia; on the road between this place and *Opus*, *Hyampolis*, *Bogdana*, which seems to have been of some importance as commanding that pass; and *Daulis*, *Daulia*, situated at some distance from the right bank of the Cephissus, on the road from *Orchomenus* to *Delphi*.

Westward of *Daulis*, a road skirted the base of Parnassus, and was known as the *Via Sacra*: at a short distance from *Daulis* it was joined by a road from the south, leading to *Ambrýsus*, *Dystomo*, and the point of junction was celebrated as the spot where *Laius* fell by the hand of his son: it was called *Triodos*, as three roads met there. Farther on, *Anemoræa* marked the boundary of the Delphian territory, and the road followed the course of the small river *Pleistus*, *Xero-potamo*, until it slightly diverged to the right hand for *Delphi*. The position of this town, the seat of the most sacred fane of antiquity, and the fabled centre of the whole world, was very remarkable. The range of Parnassus terminates southward in two bold rocks, the *Phædriades*, specifically called *Hyampæa* and *Nauplia*, which formed at their base a natural theatre, gently sloping towards the *Pleistus*. On this declivity stood *Delphi*—the temple of *Apollo* with the sacred tripod, and the cave whence the oracular responses were given, being at the back of the town, and the stream or spring (as it was more commonly called) of *Castalia*, descending between the two rocks to the eastward, and flowing into the *Pleistus*. The town was enclosed by a wall; but several buildings, as the *Stadium*, *Synedrium*, and others, stood outside, and the approaches to the town were lined with statues and chapels; the spot is now called *Kastri*. Descending the valley of the *Pleistus*, we come to *Crissa*, which gave its name to the rich plain that stretches from the neighbourhood of *Amphissa* to the head of the *Crissæan bay*: *Crissa* (it must be observed) did not stand on the sea-coast, as the name of the bay would seem to imply; *Cirrho*, *Magula*, was in that position, and served as the port of *Crissa* and *Delphi*. The Delphian territory was separated from south-eastern *Phocis* by the range of *Cirphis*: in this part of the province we meet with the towns of *Anticyra*, *Aspraspitia*, on the western side of the bay of the same name, celebrated for its hellebore: *Maræthus*, opposite to it: *Stiris*, *Stiri*, to the eastward; and *Bulis*, sometimes reckoned as a town of Boeotia.

10 *BOEOTIA* was contiguous to *Locris* on the N., *Phocis* on the W., and *Attica* and *Megaris* on the S.: on the E. and N.E. it was bounded by the waters of the *Eubæan straits*. In general features this province bears a close

resemblance to Thessaly, being girt in all directions by a circular belt of mountains, which enclose a rich and extensive plain, watered by the converging streams of the whole district. The valley of the Asôpus, which we must except from these observations, bears a similar position to the water-basin of Boötia, that the Spercheius does to that of Thessaly. There is, however, one noticeable difference—that there is no vale of Tempe in Boötia; the waters collect in the centre of the province; and we therefore have presented to us a picture of what Thessaly would have been, had the river Peneus never found an outlet. The Copaic lake discharged its surplus waters at its north-eastern extremity by subterraneous passages, now named *Catabothra*, three of which are known to have existed; these were of natural formation in the first case, but improved by art. The waters, having passed by these under the Opuntian hills, re-appear in the neighbourhood of Larymna, and discharge themselves into the Eubœan sea. The lake was in ancient times forty miles in circumference; it is now about sixty, but shallow, and in summer for the most part a mere marsh: its modern name is *Topolias*.

The heights that enclose the Boëtian plain were in the north, the Opuntian Chemis, and a lateral ridge proceeding at right angles from it towards the Cephissus, called Hyphantium; in the west, the well-known range of Helicon; in the south, Cithæron and Parnes; and in the east, the lesser elevations of Ptoum, Messapium, and Mycalesus.

The approaches from the north were three in number; by the valley of the Cephissus, the road leading from Parapotamii to Chæronea; by a pass over M. Hyphantium, from Abæ to Orchomenus; or by the coast road of Opus and Larymna, which entered at the eastern extremity of the Copaic lake. The valley between Parnassus and Helicon gave egress towards Delphi and the west, by Daulis; and there was also a route in the same direction to the south of Helicon, starting from Thespiæ. Towards the south there were several routes, (1) the coast road by Crœusa and Ægosthenæ, leading to Megaris, (2) the mountain pass of Cithæron by Dryos-cephalæ—i. e., *Oakheads*,—where the roads from Thebes and Plataea, leading to Eleuthereæ and Athens met, (3) a more direct and easy route from Thebes to Athens, by the way of Phyle and Acharnæ, which took the low ground between Cithæron and Parnes, and (4) the coast road of Oropus on the eastern shore which divided near that town, and led either over the eastern declivities of Parnes by Decelea to Athens, or by Rhamnus and the coast as far as Marathon, and thence across Pentelicus.

Though Boötia touched two seas, the Corinthian Gulf, and the Eubœan Straits, it never became a maritime country, partly through a deficiency of ports, (for Anthëdon and Bathys, *Vathi*, were neither of them good,) and partly through the richness of the soil, which encouraged agricultural pursuits. The only river in the north of any importance is the Cephissus, whose course has been already noticed; in the south, two rivers take their rise in the immediate neighbourhood of Plataea, the Oeroe, which flows westward into the Corinthian Gulf, and the Asôpus, *Asopo*, which flows eastward with a sluggish stream through a rich plain by Tanagra, into the Eubœan Sea.

Boötia abounds with scenes of historical and classical interest: its position, midway between northern and southern Greece—the character of the country, well adapted for military operations—and the number, riches, and strength of its towns, made it constantly the arena of war—‘the Low Countries of antiquity.’

The towns were numerous, and were for the most part built on the eminences which skirt the border of the Copaic plain. Orchomênus, *Scripou*, in the Homeric age the capital of Boötia, was situated on the Cephissus, near its junction with the Copaic lake; it was celebrated for the treasury of Minyas: the Acropolis stood on a steep rock, the base of which was washed by the river. Chærônêa, *Kaprena*, stood a short distance from the bank of the Cephissus on the borders of Phocis, and was of importance as com-



manding the roads to Parapotamii and Daulis; it also had its Acropolis built on a steep rock; it was the scene of Philip's victory over the Athenians, B.C. 338, and of Sylla's contest with the army of Mithridates, B.C. 86. *Lebadæa*, *Libadîa*, came next on the road to Thebes: a small stream, the *Hercyna*, flowed by its walls, and discharged itself into the Copaic lake: it was situated on a northern spur of Helicon, with the celebrated oracular cave of Trophonius in its territory. *Coronæa*, near *Granitza*, followed at a distance of five miles, between the streams *Curalius* and *Phalaros*: this was the scene of Tolmida's failure, B.C. 447, of the victory of Agesilaus, B.C. 394, and of several other military operations. In the neighbourhood of *Coronæa*, five miles southwards, rises the consecrated height of *Leibethrius*, with the grove and grotto of the *Muses*. The scenery of this and of the neighbouring *Helicon* is more soft and verdant than is usual with the Greek mountains. Though the summit of the latter is generally covered with snow, it breaks up into romantic valleys: it is particularly celebrated for its clear gushing springs, two of which were sacred to the *Muses*, *Hippocrène* and *Aganippe*, both on the north side of the mountain, the former flowing into the *Olmeius*, the latter by *Ascra*, the birth-place of *Hesiod*, into the *Termessus*. From *Coronæa*, the southern road passes by *Alalcomenæ*, *Sulinari*, to *Haliartus*, *Mazi*, on the shore of the Copaic lake, where the *Lacedæmonian* *Lysander* met his death, B.C. 395: it was destroyed by the Romans under *Lucretius*. A level plain intervenes between this place and *Thebæ*, still called *Thebes*, distant about fifteen miles. This celebrated town, the capital of *Boeotia*, was situated between two small streams, *Isménus* and *Dirce*, the former on the eastern, the latter on the western side of the city, which, afterwards uniting, flow into the Lake of *Hylice*, *Livadhî*, some five miles to the north: they are mere mountain torrents, insufficient even to supply *Thebes* with water. The Acropolis, which was named *Cadmea*, stood on a mound, elevated about one hundred and fifty feet above the plain, between *Dirce* and another small stream, called *Cnopus*. The whole city was surrounded with walls, through which seven gates gave egress in different directions. *Thebes* was several times besieged and captured. To the west stood *Thespiæ*, *Eremo-castro*, at the foot of *Helicon*, whose inhabitants sided so bravely with the patriotic Greeks against the Persians: in their territory, on the road leading southwards to *Platæa*, was *Leuctra*, *Parapunghia*, celebrated for the decisive victory of the Thebans over the Spartans, B.C. 371. *Platæa* was situated at the base of *Cithæron*, about the sources of the stream *Oeroe*, and near the modern village of *Kochla*: its name is associated with the achievements of the Greeks at *Marathon* and under its own walls, and with the stout resistance it offered to the Spartans in the *Peloponnesian* war. The fountain of *Gargaphia* was about a mile and a half to the eastward of *Platæa*; in the same direction was *Hysie* immediately under *Cithæron*, on the road from *Dryosephalæ* to *Thebes*; and farther on, *Erythræ* and *Scolus*, both a short distance from the right bank of the *Asopus*.\* The chief town in the valley of the *Asopus* was *Tanagra*, *Grimala*, on the left bank, strongly built on a rock; its territory produced excellent wine, and it retained its prosperity to a later period than the other *Boeotian* towns. A road led hence to *Delium*, leaving *Cenophyta* midway on the right hand; *Delium*, *Dhilessî*, was the border town on the side of *Attica*, and immediately on the sea; it was of importance, as commanding the coast road; the Athenians and *Boeotians* had a severe contest here, B.C. 424. Higher up on the coast were—*Aulis*, whence the Grecian fleet sailed for *Troy*; its port, *Bathys*, *Vathi*, to the south of the town; *Mycalessus*, about three miles from *Aulis*, on a hill of the same name; *Salgæneus*, on the north of the *Euripus*, considered an important point, as commanding the approaches to the strait;

\* In *Herodotus'* account of the battle of *Platæa*, the Persian and Grecian armies are described as for some time stationed on opposite banks of the *Asopus*. The main stream cannot be intended, but rather one of the small tributaries flowing from the south.

and Anthëdon, *Lukisi*, farther north on the coast, occupied chiefly by a fishing population.

11 EUBŒA.—This important island faces the eastern coasts of Locris, Boëotia, and Attica: it was separated from the second of these provinces only by the narrow strait of Euripus. From its great length, compared with its breadth, it was occasionally called *Macris*. The modern name *Egripo*, or *Negropont*, is derived through a series of changes from the word Euripus.

A chain of hills traverses Eubœa from end to end. At the southern extremity they terminate in two promontories, Caphæreus, *Cape Doro*, looking towards the Ægean, and Geræstus, *Cape Mantelo*, towards Attica, and distant about ten miles from the island of Andros. There are also two promontories at the northern extremity, but not of so great a height as the southern—viz., Artemisium at the eastern corner, *Cape Xygrochori*, the name of which was extended westward along the line of coast, and Cenæum, *Cape Lithada*, at the western. The hills which connect these extremities were known as Telethrium in the north, Dirphis in the neighbourhood of Chalcis, and Oche in the south.

The eastern side of Eubœa possesses no safe port or roadstead, and from its exposure to the north-east wind it was particularly dangerous for coast navigation. The extensive indenture, to the north of Prom. Caphæreus, called Cœla, or Cava Euboica, proved fatal to the Persian fleet, and the promontory itself enjoyed an ill fame as the scene of the destruction of the Grecian fleet on its return from Troy. The traffic was from these causes diverted to the inland passage, by the straits of Artemisium and Euripus, and hence we find the most important towns on the western side of the island. The Euripus itself is not more than eighty yards across, and was bridged over by the Boeotians, B.C. 410.

The position of Eubœa, its fertility, and the marble quarries of Carystus, made it an object of great importance both to the Boeotians and the Athenians.

The chief town in it was Chalcis, *Egripo*, at the passage of the Euripus, an Ionian city of great celebrity. Its position made it, for warlike purposes, one of the 'chains of Greece,' and equally important as a commercial depôt for the produce of northern Greece; its soil was remarkably fertile, especially the Campus Lelantus; and the site of the town, on the declivity of Mount Canèthus, was both beautiful and capable of easy defence. Eretria came next to Chalcis, both in importance and in geographical position; it was also Ionian; the old town was destroyed by the Persians after a six days' siege; it was rebuilt about a mile and a half nearer Chalcis. South of Eretria, to the port of Porthmus, *Bufalo*, the coast was known as Kale Acte—i. e. the *beautiful beach*. Styra, *Stura*, follows: then Carystus with its splendid marble quarries, and on the eastern side of Prom. Geræstus, a town and haven of the same name. The only towns on the eastern coast were Cyme and Cerinthus, neither of any importance. On the northern coast, in the district of Hestixotis, was the important town of Histiea, or, as it was called after the commencement of the Peloponnesian war, Orëus; it commanded the strait between Eubœa and the main land of Thessaly.

12 ATTICA derives its name from its peninsular position (*ἀκτή*), being surrounded on two sides by the sea, and connected with the main land only on the north and north-west. In shape it resembles an inverted triangle, of which the promontory of Sunium would represent the apex, and the Boeotian border the base line. The physical features of this province deserve particular attention, as they are interwoven with the political state of its inhabitants.

The ranges of Cithæron and Parnes form a continuous boundary on the north, hardly broken by the intervening *dip*, along which the road by Phyle to Boeotia passed. The routes across these mountains have been already mentioned; their further course in Attica will be presently noticed. From Parnes two chains diverge, one of which runs in the direction of the bay of Salamis, ending in Ægæus; while the other, rising, after a short interval, in the

heights of Pentellicus, or Brilessus, *Mendeli*, takes a parallel<sup>o</sup> direction, and under the names of Hymettus, *Telo-Vuni*, and Anhydros, *Mavro-Vuni*, terminates in the promontory Zoster, *Cape Vari*. These two ranges enclose the plain of Athens, τὸ πεδίον as it was emphatically called, on the east and west. The high ground about the head of this valley, which forms the watershed of the Attic peninsula, was called the Diacria, and occasionally Epacria, 'the high lands.' On the other side of the chain of *Ægaleus* lies the plain of Eleusis, stretching along the coast as far as the border of Megaris, and inland to the base of Cithæron. And again, on the other—i. e., the south-eastern—side of the Hymettus range follows another plain with occasional elevations, which rises towards the south and terminates in the headland of Laurium, the inhabitants of which were distinguished according to their locality, either as dwelling on the sea-coast 'Paralia,' or in the interior 'Mesogæa.' In a political sense, the inhabitants of the three plains of Eleusis, Athens, and Mesogæa, were classed together as οἱ πεδῖαι: and thus were the divisions reduced to three—the Pedimæ, the Paralim, and the Diacrim. These divisions were not established by any distinct boundaries, but followed the general physical features of the country.

Attica was divided by Cleisthenes, B.C. 510, into ten tribes, and these into demi, or *parishes*, of which 174 existed in the time of Strabo: the number of tribes was ultimately increased to thirteen.

The position of Attica, the character of its coast, and even the nature of its soil, exerted a material influence on its history. Placed midway between Northern Greece and the Peloponnesus, and yet off the line of communication between them, it was interested in the movements of all the Greek provinces. Two of its coasts were washed by the sea; and it possessed every facility for maritime commerce in the numerous ports and sheltered bays of the Saronic Gulf. And while there was this inducement to seafaring pursuits, the poverty of the soil offered no counter motive for agriculture: there were neither woods on the mountains, nor rich pastures in the plains: scattered shrubs and dwarf trees were all that met the eye, and the olive was the most valued production of the soil. The only wealth of Attica was in its minerals—in the silver mines of Laurium, and the marble quarries of Pentellicus. Thus every circumstance conduced to make Attica a *commercial* rather than an agricultural country, and to give her a strong interest in all the movements of the neighbouring provinces.

The simplest method of describing the towns and localities of Attica is to commence with Athens, which was the centre of the province in every other but a physical sense. It was situated on the right bank of the small stream Ilissus, between the hills Lycabettus, *St. George*, on the north-east, and Pnyx on the south-west, the range of Hymettus rising at a short distance off to the south-east. It thus stood on the southern verge of the plain, which stretches away towards Parnes in the north-east, and towards the sea, about four miles distant, in the south-west, the island of Salamis closing the prospect in this direction. In the centre of Athens rose the Acropolis, a massive oblong rock, one hundred and fifty feet high, having its extension east and west. The ascent led up from the south-western angle by a winding path through the Propylæa, erected by Pericles. Nearly in the centre of the platform stood the Parthënon; north of the Parthenon, the Erechtheium or temple of Minerva Polias, with the ancient statue of that goddess in olive-wood. The building was of irregular shape, and of small size compared with the Parthenon; the southern portico, called Cecropia, was the reputed burial-place of Cecrops. Facing the entrance of the Propylæa, and thus in front of the two temples mentioned, stood the colossal statue of Minerva Promachus, seventy feet high, which was visible from the sea. There was also a third temple, dedicated to Artemis Brauronia. The Acropolis was most accessible on the north side, and this accordingly was earliest fortified by a wall, called after its builders the Pelasgic. The walls on the south side were erected at a later period by Cimon.

The other remarkable spots and buildings were—the Pnyx, a low hill, facing the Acropolis to the west, and about a quarter of a mile distant, where the public assemblies were held: the Areopāgus, reserved for the use of the highest judicial court in Athens; the Agōra, in the hollow between the Pnyx and the Acropolis, an oblong inclosure surrounded by porticoes and other public buildings; and, below the south-eastern extremity of the Acropolis, the extensive theatre of Dionysus, formed on the side of the hill, the tiers of seats being cut out of the rock, and rising one above another in a semicircular form.

Closely connected with our associations of Athens are its suburbs—the grove of Academia on the banks of the Cephissus, about two miles north-west of the Acropolis, the spot where Plato taught; Colōnus Hippius, a little higher up the stream; Cynosarges under mount Lycabettus, where Antisthenes instituted the Cynic school of philosophy; and the Lycēum, Aristotle's school, on the same side of the city, nearer the Ilissus. The two celebrated streams, Cephissus and Ilissus, now lose themselves in the marsh that intervenes between Athens and the Piræus; in earlier time they united and flowed into the Phalerian bay.

Athens possessed three ports—Piræus, Munychia, and Phalērum, distant about four miles from the city. Phalerum, the most easterly, was the first used, but soon sunk into insignificance; it consisted of a large, unenclosed bay, with docks situated near the modern *Tripyrgi*. Westward of this bay the land runs out into a curved peninsula, which is almost cut off from the main land by a bay on each side. The smaller of the two bays, on the eastern side of the peninsula, formed the harbour of Munychia, *Porto Fanari*; the larger, on the western side, was the Piræus, *Porto Dhrako*.

The entrance to the harbour of Piræus was so narrow that a chain might easily be thrown across. Themistocles fortified Piræus and Munychia, by erecting walls across the neck of the peninsula, and along the line of the sea coast. Cimon, B.C. 465, connected the three ports with the city by means of two divergent walls, the northern one touching the sea at the western extremity of Piræus, and the southern at the eastern point of Phalerum. To these Pericles added a third, which had for its object the more immediate protection of the Piræus; its course was parallel to the northern wall, with a slight divergence as it approached the Piræus. These two parallel walls became the most important means of defence, and hence they were called the *northern* and *southern*, to the exclusion of the Phalerian wall, which was most properly the *southern*. When regard was had to the Phalerian, the third or intermediate was called the *middle* wall.

The most interesting localities in Attica were as follow. Eleusis, *Leſina*, far-famed for the celebration of the Eleusinian mysteries, lay immediately on the sea-coast, north of Salamis, and was connected with Athens by a 'Sacred Road,' which issuing from the north-west of that city, and passing across the Ceramicus and the Athenian plain, and through the gap left by the ridges of Ægaleus—Corydallus and Pœcilum—followed the bend of the sea-coast to Eleusis: Eleusis possessed a small harbour, commanded by the Acropolis. The plain northward of the town was commonly called the Thriasian, after the town Thria, which lay northward of the Sacred Road, under Ægaleus: it is watered by a stream named Cephissus, which joins the sea in the neighbourhood of Eleusis: across the plain led the direct road to Plataea, passing by Ænoe and Eleuthæra. The relative position of these two places is still undecided: the extensive ruins at *Gyſto-caſtro*, just under Cithæron, probably represent Eleuthæra: Ænoe would in that case stand lower down the stream, where it turns to the south at *Blaches*. Acharnæ, *Kametero*, lay due north of Athens, about seven and a half miles distant, and on the western verge of the plain: it was the largest demos in Attica, and carried on a considerable trade in charcoal. The road to Thebes passed through it, and thence by Phyle, *Fili*, which lay at the southern base of Parnes. Two roads led from Athens to Oropus and Bœotia: the most direct

crossed the Diacria by Decelēa, *Tatoy*, which was situated on an elevated peak at the head of the Athenian plain, fifteen miles distant from Athens, commanding both the road and the plain: the other avoided the hills by keeping to the south of Pentelicus, and going round by the plain of Marathon: it passed through Alopēce, skirted the northern base of Hymettus, then through Pallene below Pentelicus, and so to the region of the Ionian Tetrapolis and Rhamnus. The Tetrapolis consisted of an association of four towns, existing before the time of Theseus—viz., Probalinthus and Tricorythus, on the sea-coast; Marāthon and CEnoe, a short distance inland. In later times, Marathon obtained the ascendancy, and the plain on which these towns stood was more usually named after it. The coast here recedes inland, forming a small bay, protected by the headland of Cynosūra, *Stomi*. In the middle of the bay a small stream discharges itself, anciently called Charadrus, which rises in Mount Parnes. The spurs of this mountain and of Pentelicus approach the sea within a distance of about two miles, and enclose the plain on the west; while along the coast, north and south, two marshes, generally dry in summer, intervene between the sea and the hills. The plain thus has a length of about six miles. The modern village of *Marathona* stands on the Charadrus, but ancient Maratlon was more to the south, on the site of *Vrana*. In the celebrated battle that took place here, B.C. 490, the Greeks were posted on the declivities bounding the southern border of the plain, while the Persians occupied the line of coast, between the southern marsh and the river. The Tumulus, *Soro*, which marks the centre of the Athenian position, stands about half a mile from the shore; it is a misshapen heap of earth, two hundred yards in circumference. The *Pyrgos* to the north of it is the ruin of the tomb of Miltiades. From Marathon the road led to Rhamnus, *Ovrio-castro*, situated on a rocky promontory, and celebrated for a temple sacred to Nemesis; and thence to Orōpus, *Oropo*, the border town of Bœotia, on the right bank of the Asopus. This town was originally built on an eminence, two miles from the sea; but at the time of the Peloponnesian war it had been removed to the coast. The district on each side of the Asopus was called Oropia or Peiraice—i. e., the border country: in the contests between the Bœotians and Athenians it frequently changed hands. Aphidna was situated in the upper valley of the Charadrus, between Decelēa and Rhamnus; and Cephissia, at the foot of Pentelicus, between Marathon and Athens. In the Paralia and Mesogœa, the districts south of Athens, the most important locality was Laurium, a hill in the neighbourhood of Sunium, which yielded a large quantity of silver ore. The produce of its mines was applied by the advice of Themistocles to the formation of the Athenian fleet: in Strabo's time the mine was nearly exhausted. Sunium was important on another account—viz., as commanding the passage of vessels coming from Eubœa and the north. The promontory, now *Cape Colonna*, was crowned with a beautiful temple of Minerva: the town lay on the eastern side of the promontory. Proceeding northwards from Sunium we meet with Thoricus, *Theriko*, on the eastern coast; the island of Helēna, or Macris, *Macronisi*, stretched along opposite to it, and afforded a safe roadstead. Prasia, with an excellent harbour, *Port Rafi*, was farther up the coast: and yet farther Brauron, *Vronna*, celebrated for the worship of Diana; it stood a short distance from the sea. On the western coast the towns were more numerous, but not so important. Anaphlystus, *Anafyso*, corresponded in position to Thoricus; it stood on a river, by which it communicated with the inlet that formed its harbour. The road from Laurium to Athens, known as the 'Sphetian way,' ran parallel to the sea-coast.

It only remains to describe two islands, intimately connected with Attica, Salāmis and Ægina. The former, now *Koulouri*, lies in the northern angle of the Saronic Gulf, between Athens, Eleusis, and Megara. It is mountainous and of very irregular shape, being nearly divided in half by an inlet from its western side. The passage between Salamis and the Attic coast, where Mount Ægaleus declines, is very narrow; its entrance was guarded on

the western side by the projecting headland of Cynosura, and by the small island of Pyttaleia, *Lipsokutuli*. It was in this strait that the Persians sustained their humiliating defeat, B.C. 480. The old town of Salamis was situated on the south side of the island; the later town of historical times, on the eastern coast, opposite Ægaleus, at *Ambelakia*. This town appears to have fallen into decay after its occupation by the Macedonians, B.C. 317. On the western side of the island, the projecting headland of Budōrum fronted Nisæa, three miles distant.

Ægina, *Egina*, is situated in the centre of the Saronic Gulf, nearly equidistant from Athens, Argolis, and Corinth. In shape it is an irregular triangle, the base fronting the coast of Argolis; in size about twenty-two miles round; in character mountainous, and for the most part, unproductive. The highest point, Mons Panhellenius, on the south-eastern side, was crowned by a celebrated temple of Jupiter. The navigation about its shores was impeded by numerous rocks and shoals. The position of Ægina adapted it most admirably for the purposes of maritime ascendancy. It raised itself to an early independence, and enriched itself at the expense of the neighbouring shores on the main land. It was too important a post to escape the notice of the Athenians; when not in their own possession it was the 'cycsore of the Piræus.' They held it in their own hands from the time of the Persian war until the battle of Ægos-potami. It possessed two harbours, one on its eastern coast, the other on the western, where the chief city, Ægina, stood facing Epidaurus.

13 The small state of MEGARIS lay at the entrance of the Isthmus of Corinth. It consisted of a plain, enclosed on two of its sides by the Corinthian and Saronic gulfs, and elsewhere by mountain ranges. Cithæron separated it from Bœotia; a southern branch from that range, which terminates in two horned peaks, named the Keräta, near Eleusis, formed its eastern boundary; and on the south the lofty Oneian mountains, *Macriplagi*, culminating in Mons Geranea, *Palæovouni*, severed it from Southern Greece. Two roads led southwards; the one surmounted the precipitous Scironian rocks, which skirt the base of the Oneian range where it overhangs the Saronic Gulf; the other crossed the Oneian range, midway between the seas, by the pass of *Derbenivouni*, which the modern road follows; the central portion of the range, as well as the highest peak, is generally denominated Geranea. The road from Megara to Attica followed the coast, and was commanded by the heights of Kerata.

The plain of Megara is watered by numerous small streams flowing into the Saronic Gulf; in the centre of it stood Tripodiscus, where the various roads met for the pass of Geroneia. The capital, Megara, was built about two miles distant from the Saronic Gulf, opposite Salamis; two hills, Alkathoo and Caria, rose behind the town, each crowned with a citadel. It was connected by long walls, with its port, Nisæa, to the south-east, the entrance to which was protected by an island, Minōa, lying immediately in front of the town, and joined to the main land by a causeway. This island was incorporated with the main land as early as Strabo's time; the site of Nisæa is at *Dodæa Ecclesia*. The coast has changed so much, that the description of this locality given by Thucydides cannot be identified. Megara possessed also a port on the Halcyonian bay, Pagæ, *Psutho*, which the Athenians once occupied as a naval station.

14 CORINTH and its territory stood in the same relative position to Peloponnesus, as Megaris to Northern Greece; but there were differences in the geographical features of the country, which made the former by far the most important of the two districts. The Oneian range, which separated Megaris from Corinthia, crosses the neck of land between the Saronic and Corinthian gulfs, and runs out westward into a high peninsula, which divides the eastern coast of the latter into the Lechæan and Halcyonian bays, terminating in the promontories of Olmiæ and Heræum or Junonis, which face respectively towards Bœotia and Sicily. On the south side the range declines gradually to a small plain, and allows the seas to approach within

three and a half miles of each other at the Isthmus of Corinth. The ground between the seas is sufficiently level to admit of vessels being dragged across; and the line which they followed was called the Diolcus; it is not, however, a *dead* level, as the ground rises towards the Saronic Gulf, and there breaks off into a low cliff. A canal was frequently projected, and even attempted by Nero; the results may yet be seen in a trench about one thousand yards long from the Lechean side. There was also a wall drawn across the isthmus, about half a mile south of the Diolcus, but by whom erected is uncertain; it appears that temporary fortifications were several times erected there. The southern side of the isthmus is closed in by another range, named Onœa, and by the rock Acrocorinthus. A narrow ravine separates these two, along which the road to Peloponnesus ran, immediately under the rock. The only other entrance southwards was at the other extremity of Onœa, where it left a narrow pass close by the sea, which was commanded by the port of Cenchree. The territory of Corinthia stretched southwards about ten miles from the Isthmus.

Corinth itself was most happily situated for purposes both of war and commerce; immediately behind the town, and at a distance of two miles from the sea, rose the impregnable rock which formed its citadel, one thousand nine hundred feet high, with an area of two miles in circumference on its summit, and well supplied with water by the spring Peirœne. The walls of Corinth enclosed a circumference of ten miles, exclusive of those which connected it with its harbour of Lechæum. The town was well supplied with water by natural springs, two of which, beside that in the citadel, were called Peirene; it was further accommodated with a fine aqueduct, constructed by Hadrian. Corinth was taken and sacked by Mummius, B.C. 146, and restored by Julius Cæsar, B.C. 44. Besides the port of Lechæum, it possessed another on the Saronic Gulf, Cenchree, *Kekhries*, five miles distant; and this double port made Corinth an entrepôt for the interchange of European and Asiatic productions. Having command also of the two passes into Peloponnesus, it was naturally adapted to exercise great influence in the military affairs of Greece; but intestine divisions, and perhaps the very extent of its walls, prevented it from doing as much as we should have expected.

The Isthmus itself was the scene of annual games, which were celebrated at a spot near the Saronic Gulf, and not far from Schœnus, *Kalamaki*, the port whence vessels made the Diolcus.

15 SICYONIA AND PHLIASIA.—Westward from Corinth, a narrow but fertile plain stretches along the sea coast; inland the country is broken up into confined valleys, bounded by high hills. Three such valleys open into the plain, and the streams which flow down them were known as the river of Cleônæ, the Nemea, and the Asopus. The ridge that separates the two first was called *Ap̄sas*, *Mount Fuka*, and that between the Nemea and Asopus, *Trikarānon*, *St. George*. The Nemea, in its lower course, formed the boundary between Corinthia and Sicyonia.

The territory of Sicyon, *Vasilika*, extended along the coast nine miles, and about the same distance inland. The town itself was situated two miles from the sea, with its acropolis and other public buildings on a fortified hill of considerable area; the base of the hill is washed on the east by the Asopus, and on the west by a brook supposed to be the Helisson. It was connected with its port by long walls; these and the maritime quarter of the city were destroyed by Demetrius, B.C. 303.

The small district of Phliasia consisted of the upper valley of the Asopus, which, above the town of Phlius, turns at right angles to its future course, and has its rise in the western mountains that border on Arcadia. Phliasia was enclosed by mountains on all sides, except towards Sicyon; Lyrcœum separated it from the plain of Argos, Trikaranon from the valley of Nemea, and Celosæa from Arcadia: each of these ranges, however, had roads across. Phlius itself stood at the angle where the Asopus begins to flow towards the north.

Eastward of Phliasia, the small state of Cleonæ occupied the upper valleys of the Nemea, and of the stream on which its town stood. The hills about Nemea are perforated with caverns; and hence this was selected as the fittest scene for Hercules' contest with the lion. At Nemea, which was situated on a small plain, games were celebrated every three years; the stadium and theatre may yet be traced near the remains of the temple of Jupiter. Cleonæ, *Kurtes*, was situated on the left bank of the river, and on the high road between Argos and Corinth, built on an eminence and strongly fortified. There were two routes across the mountain to Mycenæ; a footpath called Contoporeia, and a more circuitous but easier road called Tretus, or *bored*, from the numerous caverns along it.

16 ACHAIA occupied the whole of the northern coast of Peloponnesus, westward of Sicyonia; its boundary on this side was the river Sythas; and at its other extremity the Larissus, which disembogues south of Prom. Araxus, separating it from Elis. It consists of a narrow plain, confined on the south by the high wall of mountains which enclosed Arcadia: and here its boundary was irregular, according as the mountains recede from, or approach to the sea. The line which it followed was (starting from the east) Stymp̄halus, *Ghymno Vuni*, Cyllene, *Zyria*, then the advancing Chelydoræa, *Mavrioro*, Cerynæa behind Ægium, then the lofty and wild chain of Erymanthus, *Olenos*, and lastly, a western offset from that named Scollis, which some have supposed to be identical with the Petra Olenia of Homer.

These mountains rise for the most part abruptly, presenting a lofty wall on the side of Achaia, furrowed here and there with the courses of the mountain streams. The rivers are necessarily short, the mountains seldom being distant more than fifteen miles from the shore; and, as we might expect, they vary very much in their depth at various seasons, being almost dry in summer, and coming down with violence in winter. There is only one range wholly in Achaia, and hence called Panachaicum, *Voidhia*: it is a northern spur of Erymanthus, running out towards the neck of the Corinthian Gulf. The sea coast is regular; the most northern point is Prom. Drepanum, *Dhrepano*: the coast curves slightly inward on the western side of that cape, forming the harbour of Panormus, and protrudes again in Prom. Rhium, the nearest spot to the coast of Ætolia. It then trends southward, sweeping round in a fine bay, now the bay of *Putras*, to the opposite promontory of Araxum, *C. Papa*.

The maritime district of Achaia was eminently fertile: it produced flax, in addition to grain of every description; the currant, now the staple export of the district, is comparatively a modern introduction.

The geographical character of this province, separated as it was from its neighbours, but accessible in all parts to its own inhabitants, exercised a marked influence on its political institutions. From the earliest times, we hear of a confederacy of twelve cities, which, with a slight interruption, and with a variation in the number, was maintained until the extinction of Grecian independence. The names of the cities are differently stated by writers of different ages; probably because, as one city fell into ruin, its place was supplied by another. Their names as given by Herodotus were as follow:—Pellene, on the eastern border, situated on a steep hill, seven miles from the sea; Ægira, earlier Hyperesia, *Palæo-kastro*, a mile and a half from the sea; Ægæ, on the Crathis, *Akrata*, which had disappeared as early as Strabo's time; Bura, *Trupia*, five miles inland; Helice, at the mouth of the Selinus, the original capital of Achaia; it was destroyed by an inroad of the sea, B.C. 373, at the same time that Bura was destroyed by an earthquake; Ægium, *Postiliza*, which succeeded Helice as the spot of congress: it was situated on the sea shore, west of the Selinus, possessed the best port on this coast, and was much beautified with temples and public buildings: Rhypæ, said to have been ruined by Augustus, who removed its inhabitants to Patræ: Patræ, the third capital of Achaia, which still retains its ancient name and pre-eminence: it stands on an eminence about half a mile from the



sea, with level ground intervening; a rich plain extends southward, bounded by Mons Panachaicus: Olēnus, *Kato*, at the mouth of the river Peirus or Melas, *Kamenitza*; higher up that stream, Phars on its left bank; Dyme, near *Karavostasi*, between Olenus and Prom. Araxus; and lastly, Tritæa, *Kastritza*, the inmost town of Achaia, under Erymanthus, in the highest valley of the Selinus. Most of these towns fell into decay at the time of the Roman conquest.

17 ELIS, or Elea, occupied the northern half of the west coast of Peloponnesus, from the river Larissus, which separated it from Achaia, to the Neda, *Buzi*, on the side of Messenia. These limits included four districts, differing essentially from each other in character, and for a long period politically distinct. Firstly, a very rich alluvial plain intervened between the base of the range of Scollis and the sea, reaching from the Larissus in the north, to the promontory of Ichthys, *Katakolo*, in the south, and attaining a considerable breadth by the projecting headlands of Chelonatas, *Clarentza*, and Hyrmina, *Tornese*; this was called Cæle Elis—i.e., the hollow Elis; it was watered by the Peneus, *Gastuni*, and its tributary, the Ladon. Secondly, there was the highland district of Acroëa in the north-east, consisting of the ranges of Scollis, *Sandameri*, and the southern limbs of Erymanthus—viz., Lampæa, *Astra*, and Pholoe, which form the boundary between Elis and Arcadia. A range of high ground striking off westward from Pholoe, and named Amphidôlis, separates the water basins of the Peneus and the Alpheus; and this high ground formed the northern boundary of the third division of Elis, named Pisatis, which consisted of a series of small valleys running southwards, and conveying tributaries to the Alpheus. To the south of this river, the mountains and the sea approximate so closely as to leave but a strip of coast-land: and among the western offsets of these mountains lay, lastly, the district of Triphylia.

In the Homeric poems we hear of the Epeans in Hollow Elis, and the Pylians\* southward, the Eleans appearing only as a subdivision of the Epeans. Ephyra is represented as the capital of the Epeans, situated on the river Selleis. Whether these were identical with the town Elis and the river Peneus, or whether (as some suppose) both the town and river must be sought more to the south, near the promontory of Ichthys, is a question not yet decided. At all events, Elis—which, if not existing under an earlier name, was founded soon after the Trojan war—rose to be the chief town in the north; Pisatis became a separate political district in consequence of the importance which the Olympian games conferred on the town of Pisa. The contests for the supremacy between Elis and Pisa ended in the subjugation of the latter about 770 B.C. Triphylia, which owes its name, we are told, to the mixed character of its population, consisting of the three tribes, Epoi, Minyæ, and Elei, formed at all times a distinct district, sometimes subject to the supremacy of Elis, at other times independent or allied with the Arcadians.

Elis was remarkable for its fertility, possessing a rich soil, abundance of water, and level plains. The chief towns were as follow:—In Hollow Elis—Buprasium, on the borders of Achaia; Cyllene, *Clarentza*, north of the promontory of Chelonatas, the harbour of Elis: Elis, *Palæopoli*, on the left bank of the Peneus: it was just on the borders of the plain, with its citadel on a prominent rock called *Kaloscopi*; and Pylus, surnamed, for distinction's sake, Eliacus, on the left bank of the Ladon, and about ten miles from Elis. In the Acroëa—the fortress of Opus, at the confluence of the Ladon and Peneus; Eupagium and Thalamæ, higher up the course of the latter; and Thraustus, *Dhomoko*, near the sources of the Ladon. In Pisatis—Olympia, the central spot to which the roads converged, and the scene of the most celebrated games in Greece: it was situated on the right bank of the Alpheus,

\* Homer describes the Alpheus as flowing through the land of the Pylii, which implies that the kingdom of Pylus included the later district of Pisatis.

on a small plain about three miles long and one broad, bounded on the north by the hill of Cronium, and on the west by the Cladeus, a small tributary to the Alpheus. The Altis, or sacred enclosure, containing the Temple of Jupiter and other sacred buildings, occupied a slightly elevated platform near the confluence of the Cladeus. The Stadium was on the eastern side of the Altis, and the Hippodrome a little beyond it. The place is now called *Andilalo*. At the eastern end of the plain stood Pisa, which seems to have fallen into decay soon after its defeat by Elis. Two roads led from Olympia to Elis, one of which descended the Alpheus and took the plain, passing through the towns Dyspontium and Letrini, *Phyrgo*, and near Pheia, which was probably situated at the neck of the singular promontory of Ichthys; the other crossed the mountains by Heraclea, *Streßi*, Salmöne, on the river Enipeus, *Floka*, and Pylus: Cycesium lay to the north of Olympia. In Triphylia—along the valley of the Alpheus, Epitalium, *Agulenitza*, the same as Homer's Thryon or Thryoessa, not far from the mouth of the river; Scillus, the abode of Xenophon, on the Selinus, which joined the Alpheus a short distance below Olympia; and *Plurixa*, or Phastus, higher up the river. An immense lagoon stretched along the coast south of the Alpheus, near the termination of which stood the old town of Samia, and later the fortress of Samicum, *Khaiassa*: the Anigros, *Mavro-potamo*, discharges itself a little below; Pylus Triphylicus was on the south side of this river, and distant nearly four miles from the sea.

18 MESSENIA occupied the lower half of Western Peloponnesus from the river Neda. In the north it bordered upon Arcadia, from which it was separated by the range of heights, now called *Makryplai*, that connect Lycæum with Taygetus: the highest of these hills was Cerausium, *Tetrazi*. The same series of heights descending southwards formed also the boundary between Messenia and Laconia, as far as the sources of the Pamisus, *Pirnatza*, or *Dhipotamo*, which thence formed the line of separation to the sea coast. Towards the south, the land ran out into an extensive peninsula, ending in the promontory of Aeritas, *C. Gallo*.

Messenia contains a larger extent of plain and a richer soil than any other province of Peloponnesus. The valley of the Pamisus is divided into an upper and lower plain: the former called after its chief town, Stenyclærus, to the north-east of Ithome; the latter lying along the sea-coast, and so famed for its fertility as to attain the appellation of *Macaria*. The southern and western parts of Messenia also possess a very great proportion of level ground capable of cultivation. The hills which penetrate into the interior attain no very great height; their sides were clothed with forests, and their summits were generally free from snow. The fertility of this province, resulting from the combined causes of rich soil and favourable temperature, made it an important adjunct to the comparatively barren country of the Spartans. The most remarkable hill was Ithôme, *Vurkano*, the last of a series of heights which project westward from the *Makryplai*, separating the two plains already referred to. It is situated on the right bank of the river Balyra, extending in a slightly curved form from north to south, and connected at the latter point with a similar hill of inferior height, named Mount Evan. Ithôme was an inaccessible post, and on that account selected as the citadel of the old Messenians, and in later times as the protection of their capital of Messene, which was erected under its western declivity.

The chief rivers are, the Neda, on the northern boundary, flowing between precipitous banks with a deep and rapid stream; and the Pamisus, *Dhipotamo*, with its tributaries. The Pamisus itself has but a short course: it takes its rise in swampy ground, south-east of Ithome, and flows with a full stream to the south; it is joined near its source by a river of much greater length, which drains the plain of Stenyclærus, named Balyra, *Vasiliko*, and again, near its mouth, by a tributary on its left bank—the Aris, *Pidhima*.

The topographical notices of Messenia belong for the most part to its earliest history. Homer mentions towns which had no existence in later

times, and many of the most interesting scenes of his poems are laid in this district. Pylus, the capital of Nestor, is identified with the well-known spot of that name on the promontory of Coryphasium: the honour was in old times contested by the other towns of this name in Triphylia and Elea. Andania, the ancient capital, stood on the Charadrus, an eastern tributary of the Balyra; Echalia, a little eastward, on the site of the more modern Carnasium; Anthea is supposed to correspond with Thuria, on the Aris; and Æpea with Corone. Dorium lay to the north-east of Cyparissia. Phæra and Cardamyle existed in historical times, but were not then included in Messenia.

The history of the Messenian wars introduces us to some localities in the north-eastern angle of the country, which seems to have been the point of ingress to the Spartans, and consequently the chief scene of operations. Amphæa was probably situated on the upper course of the Amphitus; Stenyclarus, on the eastern border of the plain named after it; and the fortress of Eira, on the heights of Cerausium, overhanging the Neda. Ithome has been already mentioned.

During the three centuries that followed the conquest of Messenia, we have only occasional mention of places on the coast. Between the border of Elis and Pylos there was but one town, Cyparissia, *Arkadhia*, which gave its name to the extensive bay on this part of the coast, and to the promontory that terminated it to the south. South of this, the island of Prote lies off the coast. The promontory of Coryphasium follows, the supposed site of Pylos, and the northern inclosure of the *Bay of Navarino*. The bay is semicircular, two miles and a half in breadth. An island, *Sphagia*, generally identified with the ancient Sphacteria, stretches across the mouth of the bay, leaving an entrance 1400 yards in width at its southern, and another of 150 yards at its northern extremity, opposite to which is the projecting headland of Coryphasium. On the inside of the promontory there is a lake or lagoon, now called *Osmyn Aga*,—of which there is no mention in ancient writers,—having an inlet from the harbour. The modern town of *Navarino* stands at the southern outlet of the bay, and some conjecture that this was the site of Nestor's capital. The scene of the operations in the Peloponnesian war was at the northern extremity of the bay now called *Palco-castro*. Methone, *Mothoni*, south of Pylos, possessed a good port, protected on the west by the tongue of land on which the town was situated, as well as by a rock at its mouth. The *Cenussæ Insulæ*, *Sapienza* and *Kabrera*, lie a short distance off the coast. On the eastern coast of the peninsula there were two ports, Asine and Corone, which occasionally gave name to the large bay between the coasts of Messenia and Laconia, *Sinus Asineus* or *Coroneus*, *Gulf of Koroni*. The former was situated about five miles from the promontory of Acritas, and was chiefly remarkable as a settlement of the old Dryopian stock: Corone was higher up—not on the site of *Coron*, but at *Petalidhi*. The town of Messene, *Mavromati*, the later capital of the province when the Messenians were restored to independence, was founded B.C. 370, and built under the supervision of Epaminondas: it was situated on the western side of Ithome, and the fortifications enclosed the summit of the hill. Limnæ, on the borders of Laconia, and so often a source of contention between the two countries, was probably the swampy ground about the sources of the Pamisus.

19 **LACONIA.**—The western boundary of Laconia has been already stated as the river Pamisus, and the northern continuation of Taygetus, *Macryplai*. Towards the north it was separated from Arcadia by the high ground which forms the watershed between the Alpheus and the Eurotas; near the eastern coast it was contiguous to the small district of Cynuria, and in this direction had no strongly marked natural limit; in other parts it was bounded by the sea. The two highest ridges of Peloponnesus, Taygetus and Parnon, traverse this region in a southerly direction, and occupy almost the whole of the province with their extensive ramifications; they sink towards the head of the Laconian bay, but reappear more to the south in the high peninsular ridges which end in the promontories *Tænærum*, *Cape Matapan*, and *Malæa*,

*St. Angelo.* These ranges seem to lie wide apart from each other; but in reality they almost meet at the course of the Eurotas, by means of secondary ranges, which, after a long interval of high broken ground, descend sharply into the valley from a height of about five hundred feet: the highest points\* of Taygetus are Talētum, *St. Elias*, and Evōras, to the south-east of Sparta. The Eurotas, *Iri*, is the only river of importance in Laconia, receiving numerous tributaries from both the mountain ranges: it has its source in the north-western angle of the province, on the borders of Arcadia: it receives, a little above Sparta, a considerable stream from the north-east, the Œnus, *Kelcfina*; then traverses the plain of Sparta, and afterwards the broader plain of Helos, and discharges itself at the head of the Laconian bay. The routes to the northward followed the course of the Eurotas and Œnus; the former leading to Megalopolis, and the upper parts of Messenia, the latter to Cynuria and Argos. The high country between the upper valleys of the rivers was named Sciritis, and across this there was a mountain road, that struck off from the valley of the Œnus, near Sellavia, and went direct to Tegea: on the western side, the only communication across Taygetus was from Sparta to Phœre, by a track which followed the course of the river Tiasa, *Pandeleimona*. As these roads ran over high ground, and were defensible at certain points, Laconia was justly described as δυσείσβολος,† 'difficult of access to an invading army.'

A glance at the map will show that Laconia possessed an immense extent of sea-coast; it was not however available for maritime purposes, partly on account of the deficiency of harbours, and the dangers of the southern promontories—partly from the character of the country inland, and its remote position in reference to other provinces. On the eastern coast there was only one seaport, Epidaurus Limēra, *Palæa Nomenvasia*, which was protected on the south by the projecting headland (formerly an island) of Minoa. In the Laconian bay, there was Gythœum on the western coast, which served as the arsenal of Sparta; and lower down, Teuthrène, *Scopopoli*; but neither of these appear to have had any great commerce. Nor was Laconia well favoured in respect to internal resources. The mountain ridges of Taygetus and Parion were bleak and barren. The high plain that intervenes to the secondary ridge is described as 'a poor mixture of white clay and stones, difficult to plough, and better suited to olives than corn.†' The only fertile spots were the valley of the Eurotas, and the plains of Helos and Leuce.

The most important towns lay in the valley of the Eurotas. The defile at its source was commanded by the forts of Ios and Eutæa, the former lying on the Laconian, the latter on the Arcadian side of the border. Sellasia, *Krevata*, was situated at the junction of the roads to Sciros and Cynuria, and just at the spot where the valley of the Œnus is narrowed to a defile by the close approach of two hills, named Evas and Olympus: it was thus the key to the valley of the Eurotas; and as such was occupied by Epaminondas and Antigonus in their invasions of Laconia. Sparta, or Lacedæmon, was on the right bank of the Eurotas, not far below the junction of the Œnus: it was built on a cluster of low hills, fronting the river for a mile and a half, but with a narrow plain intervening. The walls enclosed a circumference of six miles, and the Acropolis was erected on the highest of the hills: the town was divided into five districts. Immediately below the town, the valley of the Eurotas was narrowed on its left bank by the hill of Menelæum. This pass, which was commanded by the position of Sparta, was the entrance to the lower valley of the Eurotas, and the plain of Helos. The villages *Magula* and *Psykiko*, about two miles eastward of *Mistra*, stand on the site of Sparta. Therapne, *Amphisu*, was a suburb of Sparta, on the opposite bank of the river, two miles distant. Amyclæ, the second town in

\* There are in all five peaks, whence the modern name, *Pente-dactylon*.

† Euripides. Diodor.

‡ Leake's *Morea*, i. 143.

**Laconia**, stood on the right bank, about two miles and a half below Sparta, on a tributary named the Phellia; it was beautified with numerous temples. Helos was on the sea-coast, at the southern edge of the plain, near the mouth of the Eurotas.

Off the promontory of Malea lay Cythêra, *Cerigo*, an island of the utmost importance to the Lacedæmonians. It was twice occupied with effect by the Athenians, in the Peloponnesian war, and after the battle of Cnidus. The town of Cythêra stood on the eastern coast, about a mile and a quarter distant from the principal harbour, Scandea.

20 **ARGOLIS**.—This division of Greece embraced several independent states, connected together only by geographical contiguity, and not by any political bond. These states were Argos, Epidaurus, Trœzène, Hermiône, and the southern district of Cynuria, which was at some periods a portion of the Argive territory, but more frequently independent. Phliasia is generally included in Argolis; but as it is separated from the plain of Argos by natural boundaries, and belongs physically to the district that borders on the Corinthian Gulf, it has had a separate place assigned to it.

Argolis consisted of the maritime district that lies eastward of the high chain of the Arcadian mountains—*Artemisium*, *Turniki*, and *Parthenium*, *Partheni*. On the north it was separated from Phliasia by a branch of Lyrceum, and by the range of high ground proceeding eastward from it, which forms the watershed between the rivers flowing northward to the Corinthian Gulf, and those which water the plain of Argos. On these two sides its boundary is tolerably regular, but not so the line of its coast. An extensive peninsula runs out towards the south-east, formed by the high range of Aracineus and its subordinate hills—*Tittlœum*, *Cynortium*, and *Coryphœum*. This peninsula is washed on its northern side by the Saronic, and on its southern by the Argolic gulf. It terminates in the promontory of Scyllœum, *Skylî*; it has several projections, particularly that of Methâna on its northern coast; and it is fringed with numerous islands, such as Calauria, Hydrea, and others.

There is only one plain of any size, that namely, in which Argos was situated, and which stretches back from the head of the Argolic Gulf for a distance of nearly ten miles to Mycenæ. This *plain*, as well as the city, is called Argos by Homer and Euripides. It is watered by numerous streams, or rather torrents, (for they are dependent chiefly on storms and the melting of the winter snows,) the most important of which is the Inâchus, *Banîza*, with its tributary the Charadrus, *Xerias*. Argos itself stood on the right bank of the latter, about three miles distant from the sea: its citadel was built upon a steep rock that rises to the height of a thousand feet at the back of the town, named Larissa; in later times, there was a second citadel on a lower height, named Deiras, connected with Larissa: Argos retained its size and splendour down to the age of Strabo. The plain is swampy in the neighbourhood of Argos: higher up it becomes dry and parched. Mycenæ, *Kharvati*, was situated at the head of the plain: it ranks as one of the oldest cities of Greece, having been founded by Perseus, B.C. 1400; some portions of its Cyclopiæan architecture still remain: it was wholly destroyed B.C. 468. South of Mycenæ, just at the foot of the range of hills that bound the plain, was the Herœum, the common temple of Argos and Mycenæ. Tiryns, *Paleo-anaplî*, also celebrated for its Cyclopiæan remains, was situated in the plain south-east of Argos, about two miles from the sea, with its citadel on an oblong rock, elevated about fifty feet above the plain. Nauplia, the port of Argos, on a tongue of land south of Tiryns, had an excellent harbour, still called *Napoli*. The western side of the plain, south of Argos, was bounded by the hills Lycône, Chaon, and Pontinus: from the second issues the Brasinus, *Kephalaria*, the outlet, as was supposed, of the Arcadian river Stympthalus. Between Pontinus and the sea was the celebrated marsh or lake of Lerna, the scene of Hercules' combat with the monster. It was probably identical with the still existing Hælyconian pool, of which we also hear

in Grecian myths. The plain of Argos is bounded to the south by the hills which form the pass of Anigræa; on the other side of which comes the valley of the Tanus, and the district called Cynuria, or Thyreätis. This was the border-land of Laconia and Argolis, and the source of many bitter contests. During the Peloponnesian war, the expelled Æginetans were settled here by the Spartans, then in possession of it: they were in turn ejected by the Athenians, and the Argives were finally made masters of it. The chief town was Thyrea, distant a mile and a quarter from the sea, on a tributary of the Tanus: it gave its name to the bay, which served as its harbour, Thyreätis Sinus, *Gulf of Astro*. The other towns were—Anthëna, on the road from Thyrea to Sparta; and Eva, a border town in the same direction. The territory of Epidaurus extended chiefly along the north-eastern coast of Argolis; but it appears to have stretched also across the peninsula. It consisted of the valleys of the Arachnæan range. Epidaurus itself, *Pidhævro*, lay on the eastern coast opposite Ægina, on a promontory: the small plain that belonged to it for two miles along the sea-coast, produced, and still produces, the vine. Epidaurus possessed a fleet, and its position was favourable for maritime purposes: its chief celebrity, however, arose from the temple of Æsculapius, about five miles distant, which was visited from all parts of the world; it was situated in a thickly-wooded deep valley, under Mount Tittheum. Træzene occupied the eastern, Hermione the western, extremity of the peninsula. The former town was situated opposite the peninsula of Methana, and equi-distant (at an interval of two miles) from two bays on each side of it: its chief port, Pogon, so called from its resemblance to a beard, was protected by the island Calauria: the citadel was on a rugged hill, the base of which was washed by streams on either side; the site is called *Damala*. Methana, or Methône, was connected with the main land by a very narrow neck, which the Athenians walled across in the Peloponnesian war. The island Calauria is chiefly memorable for the death of Demosthenes, which took place at the asylum of Neptune: the channel between it and the coast is now so shallow as to be fordable, and hence called the Straits of *Poro*. Hermiône, *Kastri*, stood on a projecting tongue of the southern coast, with the hill Pron rising behind, and the island of Hydrea, *Hydra*, opposite to it: in its territory were some towns of little importance, as Ialica westward, and Mases near the southern promontory, off which lay the island of Tiparëus, *Spezzia*.

21 ARCADIA.—It now only remains for us to describe the central district of Peloponnesus. Its boundaries have been already stated in the description of the contiguous countries. It consists of a highly elevated plateau, broken up by mountains and river courses, and in some few spots opening into plains of varied extent, the whole being encircled by a higher barrier of mountains. There is but one outlet for the waters of this large district—that, viz., by which the Alpheus passes into the maritime district of Elis. Nature has provided, however, an escape for the rivers which do not flow into the Alpheus, by subterranean channels, *Katabothra*, worked through the limestone of which the rocks consist: they are found especially in the eastern part of Arcadia.

The most marked natural division of Arcadia is that which separates the water-basin of the Alpheus from the eastern plains of Mantinea and Tegea, consisting of a series of heights known from north to south as Aroania, Penteleum, Sciathis, Mænälus, and Borëum. Between these heights and those which form the eastern boundary of Arcadia—Artemisium and Parthenium—there extends a long valley or strip of plain, subdivided by lesser heights into portions, which formed the districts of separate towns. Along this valley ran the road that communicated between the Isthmus of Corinth and Laconia—the scene of so many encounters in the later history of Greece. The road entered Arcadia, by way of Stymphälus, at the north-eastern corner. The plain of Stymphälus, *Kionia*, was about six miles in length, bounded on the northern side by a spur of Cyllene of that name, on the southern by

Apelaureum; and on the western, by Oligyrtus. The waters thus enclosed collected in a lake, on the banks of which stood the town, and escaped by a subterranean passage, emerging, as was believed, in the Argolic river of Erasinus. The plain of Caphyræ follows on the southern side of Oligyrtus, similarly surrounded, with the town situated at the western extremity of the Orchomenian lake: the Achæans were defeated near this place by the Ætolians. A hill called Trachys, projecting towards the lake from the east, bounds the plain of Orchomenus; the town itself, *Kalpaki*, was strongly posted in the ravine that connects the plains of Caphyræ and Orchomenus, through which the road passed, opposite Trachys. The plain extends southwards to the hill of Anelisia, *Armenia*, over which the road crossed to the plain of Mantinea: this was the most favourable spot for military operations, and no less than four important actions occurred here. Mantinea itself was originally situated in the northern part of the plain, on a hill now called *Qurtzuli*: it was afterwards removed into the centre, near Mount Alesium, where it lay on both sides of the small stream Ophis, covering a large area, and altogether one of the most important towns of Greece. The scene of contest between the Boeotians under Epaminondas, and the Lacedæmonians and others, B.C. 362, lay in the southern part of the plain, under the wooded height of Scope. From Mantinea, roads led not only north and south, but eastward across Artemisium to Argolis, and westward to Methydrium. The plain of Tegea was separated from the Mantinean by the Pelagus Wood; it was about ten miles in length by five in breadth, bounded on the east by Parthenium, on the west by Mænalus, and on the south by Cresium. The town itself lay in the southern part of the plain, south-east of *Tripolitza*, and came next to Mantinea in size and importance: its proximity to Laconia brought the Tegæans into frequent collision with Sparta, though occasionally, as in the Peloponnesian war, it led to an alliance with that power. Tegea seems to have retained its importance down to the time of Pausanias. From Tegea, the road to Laconia began to ascend, by a stream reputed to be the upper course of the Alpheus, to the high land of Sciritis. There was also a pass thence to Argos across Parthenium, and a track by the course of Gareates to Thyrea. The western portion of the Tegæan plain is half enclosed by the advancing height of Boreum: in the angle of it, and on the road that led to Megalopolis, was situated Pallantium, *Tripolitza*, after which the surrounding plain was named. The chief celebrity of Pallantium was derived from the tradition, that Evander, the founder of Rome, came from thence. A road crossed the Mænalian ridge thence to the upper valley of the Alpheus and Megalopolis.

The western portion of Arcadia, consisting of the water-basin of the Alpheus, is far larger than the eastern valley we have just described. The general course of the Alpheus is from south-east to north-west: the position of its sources was undecided; the common opinion of the ancients was, that the Alpheus and the Eurotas had a common source in the high ground of Sciritis, and that, after flowing together for a short distance, they were engulfed in a *katabothra*, and separating, reappeared on different sides of the mountain, the Alpheus at Pegæ, south-east of Megalopolis. Another account, however, represented the Alpheus as rising in the district of Tegea.

The valley of the Alpheus consists of an upper and a lower plain, connected by a long ravine: in the former Megalopolis was situated—Heræa formed the centre of the latter; the straits or narrow passage lay about Brenthie, where the advancing heights of Lycæum impended over the river. The plains possessed a rich soil, and the banks of the river were shaded with groves of plane-trees; most of the hills were covered with forests either of oak or fir, intermixed with pasture-ground, which adapted this province for pastoral pursuits; the temperature is considerably below that of the maritime districts of Peloponnesus. The most important tributaries of the Alpheus are from the north—i. e., on its *right* bank: they were—the Helisson, *Davia*, which receives the waters of the western declivities of Mænalus and crosses the

plain of Megalopolis; the Gortȳnius, *Atzikolo*, in the centre of the province, which joins the Alpheus in the ravine below Brenthe; the Ladon, which flows through the plain of Heræa: this river exceeds the Alpheus in volume of water, and in modern times receives the name *Rufas*, by which the lower course of the Alpheus is distinguished; it drains the northern portion of Arcadia, receiving tributaries from the Aroanian mountains and from the valleys westward of Orchomenus; and lastly, the Erymanthus, *Dhimitzana*, which runs parallel to the range of the same name, near the border of Elis.

The most important town of this district was Megalopolis, *Sinano*, the later capital of Arcadia, erected by the advice of Epaminondas, B.C. 370: it was built on both banks of the Helisson, and in the centre of the plain which extended from the hills to the Alpheus: its size was so great that the population of many neighbouring towns was drawn off to fill it: in Strabo's time it was nearly deserted. Heræa, *Aiani*, on the right bank of the Alpheus, above the junction of the Ladon, was the chief town in the lower valley, and its proximity to the Elean frontier exposed it to frequent contests. Aliphæra, *Nerovitza*, stood south of Heræa, on a height commanding the plain; the Eleans occupied it before the Social war, as an excellent post for offensive operations. South of Aliphæra, the ground rises to the hill of Cotylum, which separates the valley of the Neda from that of the Alpheus. The chief town on the Arcadian bank of this river was Phigalia, *Parlista*, strongly posted on a precipitous rock overhanging the Neda; its position on the borders both of Elis and Messenia exposed it to frequent struggles: it possessed numerous handsome temples, the most celebrated being that of Apollo Epieurius at Bassæ, the remains of which are still very considerable. In the northern part of Arcadia we meet with Psophis, *Tripotamia*, on M. Erymanthus, an important post, as it commanded the road that led from Elis and Arcadia across Erymanthus to Achaia; Cleitor, near *Mazi*, at the junction of a small stream of its own name with the Aroanius, a northern tributary of the Ladon, surrounded by hills and strongly fortified; and Cynætha, *Kalavryta*, north of Cleitor, on the Achaean side of the mountain-barrier, and on the banks of the Erasinus which flows into the Corinthian Gulf. Between Cynætha and Pheneus the river Styx takes its rise, on the northern declivity of the Aroanian range. Pheneus, *Fonia*, lay under Mount Cyllene, situated in the midst of a plain like that of Stymphalius, with a lake in the centre, receiving the streams of the Olbius and Aroanius, and discharging them by a *katabothra*: occasionally the outlet filled up, in which case the waters burst forth into the Ladon, and caused an inundation. The remains of an embankment to restrain these inundations are still visible. The town of Pheneus stood at the north of the lake, with its citadel on a cliff.

## II. *The Isles of the Ægean Sea, and Cyprus.*

The Isles of the Ægean Sea were ranged by Greek writers under two classes, the Cyclādes and the Sporādes. The former consisted of the group that surrounded the sacred isle of Delos, the numbers and the names of the islands being, however, very variously stated: the latter included all the remaining islands, which were termed Sporades, i. e., the 'scattered,' from their irregular positions with respect to each other. Many of the Sporades have been already described in the account of Asia Minor, along whose coasts they chiefly lie: the Cyclades remain to be described.\* Andros, *Andro*, Tenos, *Tino*, and Myconos, *Mycono*, lie in a line with Eubœa, from which the first is distant only ten miles, stretching towards the south. Delos, *Delo*, follows, south of Myconos, held sacred as the birthplace of Apollo and Diana, and hence chosen by the Athenians as the place of congress, and as the treasury of their confederation; Mons Cynthus rises in the centre of the island. At a distance of half a mile lay Rhenœa, also sacred to Apollo, and at one time connected with Delos by a chain: it was, indeed, frequently called Delos, and shares with it the same modern name. After the decay of Corinth, Delos became, through its central position with respect to Europe and Asia, and through the excellence



of its port, a place of commercial importance. Syros or *Sýra*, *Syra*, the birthplace of Pherceydes; the barren rock of Gyárus, *Chiura*, used as a place of banishment by the Roman emperors; Cythnus, *Thermia*, the modern name indicating the existence of warm springs; and Ceos, *Zea*,—lie westward of Delos towards Attica, from the coast of which the last was distant twelve miles. Ceos was at one time the most important of the Cyclades, possessing four towns, two of which had disappeared before Strabo's time, while the other two, Iulis and Carthaea, were flourishing. Ceos gave birth to Simonides and Bacchylides. South of Cythnus was Seriphos, *Serpho*, about twelve miles in circumference, the scene of Perseus' exploits, and in later times used for the same purpose as Gyarus; then Siphnus, *Siphanto*, in the age of Herodotus one of the richest of these islands from its gold and silver mines, but in Strabo's time poor even to a proverb. Cimólus, *Kimoli*, was celebrated for fuller's-earth; Melos, *Milo*, the most southerly of the group, was fertile and rich in all sorts of productions: lying opposite the coast of Laconia, it was colonized from Sparta, and its adherence to that state during the Peloponnesian war led to the capture of its chief town and the extermination of its inhabitants. South of Delos lie—Paros, *Paro*, with the celebrated marble quarries of Marpessa, and also famed for excellent figs; Oliárus, *Antiparo*, a small island about two miles to the south-west; and Naxos, *Naxia*, east of Paros, the largest of the Cyclades, being nearly eighty miles in circumference, celebrated for its wine, and, prior to the Persian war, the most powerful of the Cyclades: its town of the same name was taken in the expedition of Datis and Artaphernes.

Of the Sporades, there remain to be mentioned, Ios, *Nio*, south of Paros, the reputed burial-place of Homer; Thera, *Santorin*, also called Calliste, the most southerly of the group, occupied by Minyans from Laconia, who became in later times the founders of Cyrene: Amorgus, *Amorgo*, south-east of Naxos, known for its manufacture of linen: Astypalea, *Stampalia*, of irregular shape, about ninety miles in circumference: Telos and Chalcia between Astypalea and Rhodes: and Carpathus, *Scarpanto*, midway between Rhodes and Crete.

The important island of Creta, *Candia*, closes the Ægean Sea on the south, stretching across from east to west, in a length of about one hundred and forty miles. It is traversed by a lofty chain of mountains: the highest point is in the centre of the island, Mount Ida, *Psiloriti*, the summit of which, nearly 3000 feet above the sea, is covered with snow for the greater part of the year: in the western half the prominent range was called Leucos, *Asprovouna*, and in the eastern, Diete, *Lasiti*. These mountains are for the most part well covered with forests; being of a calcareous formation, they abound in caves and grottoes.

In shape, Crete resembles an irregular parallelogram: the two western angles or promontories, were known as Kriu-metópon, *Cape Crio*, in the south, and Corýcus, *Cape Grabusa*, in the north. The corresponding promontories at the other extremity were Ampélus, *Cape Xacro*, and Samonium, the Salmône of the 'Acts of the Apostles,' *Cape Salomo*.

The towns scattered along the coast were very numerous: we shall mention Cydonia, *Khania*, on the northern coast, at the neck of the peninsula of Cyamum, with a good harbour; Cnossus, or Gnossus, north-east of Ida, at a short distance from the coast, the ancient capital of Minos, and at all times the principal town of Crete: it possessed a port, Heracléum, eastward of *Candia*: the site of Gnossus is now called *Macron-teichos*: Leben, *Leda*, the port of Gomýna, to the eastward of Prom. Leon; and westward of that promontory 'the Fair Havens,' Kaloi Limēnes, at which St. Paul touched: Gortýna, in a plain south of Mount Ida, in Roman times the capital of Crete; its ruins are visible at *Hagios dheka*: and Lyctus, *Lytto*, about fifteen miles south-east of Gnossus, and at the same distance from its port of Chersonesus: it was so considerable a town as at one time to rival Gnossus.

Cyprus, which still retains its name, lay equidistant from the coasts of

Asia Minor and Syria, in that part of the Mediterranean which was called the Pamphylium Mare. It was a Greek island in respect to population; the Phœnicians, who originally occupied it, were confined to the southern coast, while the Dorians held the northern, and the Ionians the eastern. The island is traversed from west to east by two ranges of mountains, the most southerly of which is the Mons Olympus of the ancients, *Mount St. Croce*: these ranges are so lofty as to retain the snow for many months, and their direction exposes the southern coast to extreme heat. Olympus terminates in the west, in Prom. Acamas, *St. Epiphanio*, and in the east, where it runs out into a horn, in Prom. Dinarctum, *Cape St. Andre*, with two insulated rocks beyond, named Kleides, '*The Keys*.' The length of the island is one hundred and forty miles, and its greatest breadth sixty. There is only one plain of any size—viz., that of Salamis on the eastern coast, watered by the river Pedæus; it is formed by the diverging chains of Olympus, the lower of which, Aous, ends in Prom. Thoni, *Pala*. The chief towns were—Soloe, *Aligora*, a seaport on the northern coast, famous for its corrupt Greek (whence the term *Solæcism*): on the east coast, Salamis, at the mouth of the Pedæus; after Constantine's reign it was called Constantia, probably having been rebuilt by him; it was the chief town in the island: on the southern coast, Amathus, with copper-mines in its neighbourhood; and Paphus, a double town—the old distinguished as Palæpaphus, about a mile from the sea-coast at *Kuhla*; and the new a seaport town, somewhat to the westward of Prom. Zephyrium at *Baffo*. The first was the celebrated seat of the worship of Venus.

### III. *Illyricum, Illyris, or Illyria.*

This was the general name for the mountainous district that borders on the eastern shore of the Adriatic Sea, from Histria to Epirus. In the north it was contiguous to the province of Pannonia, from which it was separated by a line parallel to the valley of the Savus; eastward, the Bebii Montes and the chain that bounds the valley of the Drilo, named Barnus, separated it from Mœsia and Macedonia. Illyria was divided into two parts, Romana and Græca: the first, the Roman province of Illyria; the second, annexed by Philip II. to Macedonia, and included in the Roman province of that name. The lower course of the Drilo, *Drin*, which joins the Adriatic just where the coast takes a due southerly direction, forms the separation between them.

This country was little known to the writers of Greece and Rome. The high mountains that shut it off from its eastern neighbours, the wild character of its inhabitants, the intricate navigation of its coasts, and the comparatively short and easy transit to Italy by the neck of the Adriatic Sea, led to its being little frequented. In later times, indeed, Epidamnus became the port for the overland route from Italy to Byzantium; and this conduced to a better acquaintance with the southern portion.

Illyria Romana, or Barbara, was the northern division. Ranges of mountains running parallel to the sea, traverse it from north-west to south-east, under the names Albis, or Albanus, and Ardius. The only river of importance is the Drilo, which takes its rise in Lake Lychneitis. The province was occupied by three dominant tribes—the Iapodes, in the north, on the boundaries of Pannonia, who were subdued by Augustus; the Liburni, who occupied the upper half of the sea-coast, a seafaring people, who early submitted to the Romans, and rendered them good service: and the Dalmatæ, who occupied the lower half of the coast, and were subdued by Statilius Taurus, B.C. 23. After the subjugation of these, Augustus made Illyria into a province. In the later division of the empire, Illyria Romana, together with Pannonia and Noricum, constituted a diocese of the Italian prefecture.

The chief towns were—Scardōna, *Scardin*, on the estuary of the river Titius, the seat of the conventus juridicus for Liburnia; Salōna, on a gulf which still retains the name, the native place of the Emperor Diocletian, who erected a splendid palace, part of which yet remains, at Spalatum,

*Spalatro*; Epidaurus, at the western entrance of the *Gulf of Cattaro*, a Roman colony, which retained its importance until the irruption of the Slavonians; Lissus, *Alessio*, on the left bank of the Drilo, founded by Dionysius, tyrant of Syracuse; its Acropolis was situated on an inaccessible rock; and Narōna, *Vido*, on the river Naro, the seat of a conventus juridicus.

Off the coast of Illyria Barbara lay a number of islands, known as the Liburnicæ Insulæ, of which we shall mention—Issa, *Lissa*, one of the smallest, but yet most important from the Greek settlement established there; it was famous for its wine and for its light vessels, 'Iembi Issæi'; Pharos, *Lesina*, between Issa and the main land, colonized by inhabitants of Paros; and Melita, *Melida*, the most southerly, which has been by some identified with the Melita on which St. Paul was shipwrecked.

2 Illyria Græca extended from the river Drilo to the neighbourhood of the Acro-Ceraunian Promontory. The coast was fertile, and well populated: the interior mountainous, and only adapted for sheep feeding. Parallel to the mountain range of Barnus, which formed the eastern boundary, runs another called Candavius Mons, and between them was situated the large lake Lychnitis, *Lake of Ochrida*, in which the Drilo has its rise. The river Aous, *Boiussa*, enters the southern portion of this province: and there were two other important rivers, the Apsus, *Beratino*, which takes its rise in the Candavian range, and the Genusus, *Skombi*, somewhat higher up the coast.

The inhabitants of Illyria Græca were divided into a number of tribes, of whom the Taulantii seem to have been the most important, occupying the whole extent of the sea-coast: the Parthini lived northward of Lake Lychnitis, in the valley of the Drilo. The most important towns were Epidamnus, *Durazzo*, founded by Coreyræans, and well known in connexion with the commencement of the Peloponnesian war; the Romans, considering the latter part of the name ominous, changed it to Dyrrachium; under them it became the most important place on this coast, being the commencement of the Via Egnatia; Apollonia, *Polina*, also a Coreyræan colony, and under the Roman supremacy the seat of a famous university: and Lychnidus, *Ochrida*, the ancient capital of the Dassaretæ, on the northern shore of the lake of the same name.

## CHAPTER VII.

## I. ITALIA.—II. SICILIA, SARDINIA, AND CORSICA.

I. *Italia.*

§ 1. General description. — 2. Political divisions. — 3. Liguria. — 4. Gallia Cisalpina. — 5. Venetia, Carnia, and Histria. — 6. Umbria. — 7. Etruria. — 8. Picenum. — 9. Sabini, Marsi, Peligni, Vestini, and Marrucini. — 10. Latium. — 11. Campania. — 12. Samnium. — 13. Apulia. — 14. Lucania. — 15. Bruttium. — 16. The Roman Roads.

THE name Italia was originally applied only to the southern point of the peninsula below the Iametic and Scylaccan bays. The Greeks who settled on the south coast extended its application northwards to Pæstum and Tarentum. In the third century B.C. the Romans included under it the country as far north as the Arnus and Rubico. Lastly, Augustus gave the name its widest acceptance by adding Gallia Cisalpina and Histria. Its boundaries at this period were—the Alps, in the N. and N.W.; the Varus and the Mare Inferum, on the W.; the Arsia and the Mare Adriaticum, on the E.; and the Mediterranean on the S.

The geographical features of Italy are strongly marked; the Alps sweep round in a semicircular form from sea to sea, and interpose a barrier between it and the rest of Europe. They were divided into the following distinct ranges, the names of which are preserved in modern geography—Maritimæ, from the shores of the Mediterranean to M. Vesulus, *Monte Viso*; Cottivæ (named after Cottius, who maintained his independency in this part of the range,) about the head-waters of the Duria Minor, including M. Matrōna, *Mont Genève*; Graivæ, northwards to Cremonis Jugum, *Cremont*; Penninæ, about the *Great St. Bernard*, across which was a much frequented pass, with a temple sacred to Jupiter Penninus at the highest point; Rhæticiæ, eastward to the Atagis, *Adige*, with M. Adūla, *St. Gothard*; Venetæ and Carniciæ, from the Atagis to M. Tullus, *Terglou*; and lastly, Juliæ, to the borders of Illyria.

From the western extremity of the Alps emanates the subordinate range of Mons Apenninus, which forms the backbone of Italy; it commences near *Genoa*, and following for a while the line of the sea-coast, gradually diverges into the heart of the country, and traverses in a south-easterly direction the whole length of the peninsula, crossing over finally into the island of Sicily. It attains its greatest height in Samnium, where it emits an important offset to the eastward, which, passing through Apulia and Calabria, terminates in Prom. Salentinum. The Apennines occupy with their lateral ridges a very considerable portion of southern Italy, and form an important feature in the political geography of that country. The high grounds supplied summer pasturage to the flocks of the Apulian and Campanian plains; the declivities were clothed with valuable forests, and the valleys were adapted by their varying altitude to every sort of agricultural produce, and at the same time afforded numerous sites for towns and villages, peculiarly suitable for a rude and insecure state of society.

Northern and Southern Italy differ widely in their general aspects: the former consists of an immense plain, lying between the Alps and the northern Apennines, and watered by the Padus, *Po*, and its numerous tributaries; the latter is broken up in all directions by the lateral ridges of the Apennines, which, in some provinces—as in Etruria, Umbria, Lucania, and Bruttium—penetrate to the sea-coast, while in others they decline at a greater or less

distance from it, and leave remarkably fertile plains, as in Campania and Apulia. The rivers in this part are necessarily short: the most important are—the Arnus, *Arno*, in Etruria; the Tibēris, *Tiber*, which has gained a world-wide celebrity from the mighty city which stood on its banks; the Vulturnus, *Follorno*, which rises in Samnium and joins the sea in Campania; the Aufidus, *Ofanto*, in Apulia; and the Aternus, *Pescara*, higher up the eastern coast.

The coasts of the Adriatic and Tyrrhenian seas present a marked contrast; the former is comparatively very regular, the only noticeable feature in it being the cluster of hills named *M. Gargānus*, *Gargano*, which projects into the sea and forms a rounded peninsula: the upper part of this coast has been much influenced by the quantities of soil deposited by the *Po*. The coast of the Tyrrhenian sea, on the other hand, abounds with bays and promontories; commencing from the north, the most important are—*Sinus Ligusticus*, *G. of Genoa*; *Prom. Circæi*, *M. Circello*, in Latium; *Sinus Cumanus*, or *Crater*, *Bay of Naples*, bounded by *Prom. Misēnum*, *C. Miseno*, in the N., and *Prom. Minervæ*, *C. Campanella*, in the S.; *Sinus Pæstani*, *G. of Salerno*, bounded on the S. by *Prom. Posidium*; *Sinus Lameticus*, *G. of Eufemia*, also known by the names *Terinæus*, *Hipponiates*, and *Vibonensis*; and *Prom. Scyllæum*, formed by the prominent cliff of *Scylla* at the northern entrance of the Sicilian Straits. The southern coast is also irregular; the peninsula terminates in a double promontory, *Leucopetra*, *C. dell' Armi*, and *Prom. Herculis*, *C. Spartivento*: northwards, there is the *Sinus Scyllæus*, *G. di Squillace*, opposite to the *Lameticus*, bounded by *Prom. Coeynthum*, *P. di Stilo*, on the S., and *Prom. Lacinium*, *C. Colonne*, on the N.; and higher up, the *Sinus Tarentinus*, *G. of Tarento*, enclosed on the E. by the Calabrian peninsula, which ends in *Prom. Iapygium* or *Salentinum*, *C. di Leuca*.

2 The earliest political divisions of Italy, and the periods at which the changes of population and dominion took place, are questions still involved in great obscurity. All that will be here attempted will be to state as concisely as possible the prevailing opinions on this subject, as far as they bear upon the geographical description of this country.

The Greeks mention certain territorial divisions named after the dominant tribes, viz., *Ænotria*, or *Italia*, in the south; *Ausonia*, or *Opica*, central Italy; *Iapygia*, along the eastern coast, from *Garganus* southwards to *Prom. Iapygium*; and *Tyrrhenia*, the western coast, from the *Liris* northward: they also mention the *Ombrici*, or *Umbri*. These names represent the aboriginal tribes, who attained importance before the foundation of Rome. They were in number five:

1. The *Osci*, *Opici*, or *Ausōnes*. This tribe seems to have advanced from the southward, and to have occupied the western coast from the *Silarus* to the *Tiber*, and inland to the central range of the *Apennines*. In historical times they were subdivided into the *Æqui*, who held the high ground that bounds the plain of *Latium*, from *Tibur* to *Præneste*; the *Volsci*, who held a similar position from *Præneste* to *Tarracina*; and the *Aurunci*, on the borders of *Campania*, about *Suessa Pometia*. The *Latini* were probably a mixed race, formed by a conquest of the *Osci* over the *Tyrrheni*.

2. The *Umbri* or *Ombrici*. In historical times, this tribe was confined to a district north of the *Apennines*; but in an earlier age, they possessed *Etruria* (where a trace of them remained in the river *Umbro*, and the district *Umbria* about its mouth) and the upper coast of the *Adriatic* to the mouth of the *Po*. The advance of the *Tusci* on the west, and the *Gauls* on the north, drove them into the fastnesses of the *Apennines*.

3. The *Tusci*. The indigenous name of this important tribe was *Rasena*: by the Greeks they were improperly called *Tyrrheni*, which in reality designates the Pelasgic element of the population; by the *Latins* *Tusci* or *Etrusci*, and their country *Etruria*. The extent of their settlements was once far beyond what they held in historical times; they owned the country north of the *Po*, between the *Ticinus* and the *Athesis*—the interior of *Gallia Cispa-*

dana—their later country of Etruria, whence they had ejected the Umbri—and lastly, a confederacy of towns as far south as Campania, which, however, at an early period gave way before the advancing power of the Osci.

4. The Sabini or Sabelli. This tribe occupied the high valleys of the Apennines on both sides of the mountains, from the borders of the Umbri southwards. At the time of the foundation of Rome, they had descended into the *Campagna*, and in later times we find a branch of them, the Hernici, settled in the valley of the Trerus, a tributary to the Liris. The Samnites, and a variety of tribes on the eastern coast, the Hirpini, Frentani, Picentes, Peligni, Marsi, and Lucani, were all members of the Sabine race.

5. The Tyrrheno-Pelasgi. This may be deemed an immigrant tribe from Greece; it formed, however, a most important element in the population of Italy. At the era of the foundation of Rome, the Pelasgi were scattered along the sea-coasts of Campania, Latium, and Etruria, rather as settlers than as possessors of the country: they were also found on the northern coast of the Adriatic, in the towns of Hadria, Truentum, Numana, &c.: the kindred races of the Henēti in Venetia, and Istri in the peninsula of Illyria, formed a connecting link between the Pelasgians of Italy, and the Illyrian and Epirote tribes of the eastern coast. In the south they were found in still greater numbers: from the headland of Garganus to the Iapygian promontory that were known as Iapyges, subdivided into three clans, Daunii, Peucetii, and Messapii. The Choni of the eastern, and the Œnotri of the western coast of Lucania and Bruttium, were also members of the Pelasgian race.

It now only remains to notice those who were decidedly of foreign extraction; (1) the Ligures, Ligyes, or Ligustici, occupied Gallia Cisalpina westward of the Ticinus, and the maritime province of Liguria; they were probably connected with the Celtæ, and were found not only in Italy, but westward of the Alps to the Rhone, and even at one time to the Pyrenees; (2) the Ibères, also a Celtic race, were found in the islands of Corsica and Sardinia, and the kindred tribe of the Sicani or Sicili in Sicily; and (3) the Phœnicians had settlements both on the northern and southern coasts of Sicily, and in Sardinia.

The two centuries after the foundation of Rome witnessed an important change in the population of southern Italy, from the numerous and flourishing colonies planted by the Greeks. The part of the coast along which they were settled, from Tarentum to Rhegium, was named Græcia Magna.

In the north, the entrance of the Gauls effected a permanent revolution in the position of the Italian races, and established a new territorial division. As early as the sixth century they are said to have crossed the Alps, and, ejecting the Etruscans, settled themselves in the rich plains of *Lombardy*. About B.C. 500, fresh tribes appeared, the Boii and Senones, and occupied the district between the Po and the Apennines, thrusting the Umbrians back into the mountains, and altogether restricting the Etruscans to their territories south of the Apennines. The Ligurians were also dislodged from their possessions north of the Po. The extensive district which the Gauls thus occupied was called Gallia Cisalpina.

The periodical migrations of the Samnites from the central range of the Apennines, also gave rise to new geographical divisions. The precise dates of these migrations are not known, but they may be considered as having taken place in the fourth century B.C. The Lucani, in Lucania; the Bruttii, in Bruttium; the Vestini, Frentani, and others on the eastern coast, are all offshoots of the Sabellian stock.

The settlements of the forementioned tribes, who, with one or two exceptions, communicated their names to their territories, became the foundation of the political divisions of Italy. In the time of Augustus, when the Roman supremacy was established over the whole peninsula, it was divided into the following eleven regions:—1. Latium and Campania; 2. Apulia, Calabria, and the Hirpini; 3. Lucania and Bruttium; 4. Samnium, the Frentani, Marucini, Peligni, Marsi, Vestini, and Sabini; 5. Picenum; 6. Umbria;

7. Etruria; 8. Gallia Cispadana; 9. Liguria; 10. The eastern half of Gallia Transpadana; 11. The western half of Gallia Transpadana. These we shall proceed to describe, commencing with the northern districts.

3. **LIGURIA** was bounded by the Sinus Ligusticus on the S., the river Varus, *Var*, on the W., the Macra on the S.E., separating it from Etruria, and the Padus on the N.: it thus comprehended *Genoa*, *Piedmont* south of the *Po*, and part of *Parma*.

The Apennines and Maritime Alps traverse it in close proximity to the Mediterranean Sea, leaving but a narrow strip of coast land, along which ran the important route to Gaul, named the *Via Aurelia*. The northern declivities of these ranges slope down towards a spacious plain, crossed in this province by numerous tributaries to the *Po*, of which the most important was the Tanarus, *Tanaro*. The Ligurians were divided into numerous tribes, classed under two divisions as Alpini and Montani; the former occupying the Alps, the latter the Apennines: the most important were—the Taurini, between the Padus and the Tanarus; the Vagienni, in the mountainous region, which contained the sources of these rivers; the Intemelii, on the coast near the western border; and the Ingauni, to the eastward.

The most important towns were—*Genua*, *Genoa*, a much-frequented seaport at the head of the Sinus Ligusticus; *Alba Pompeia*, *Alba*, on the Tanarus, surnamed after Pompeius Strabo; *Asta*, *Asti*, farther down the same river; and *Dortona*, *Tortona*, to the eastward.

4. **GALLIA CISALPINA**.—The northern part of Italy was called in historical times Gallia, from the race who occupied it, and, to distinguish it from the other country of that name across the Alps, the names *Cisalpina*, *Citorior*, and sometimes *Togata*, were added, the last indicating the use of the Roman *toga*, in contradistinction to the Celtic dress which prevailed in Gallia Braccata. This large district was bounded on the W. and N. by the chain of the Alps, as far as the valley of the Athösis, *Adige*; on the E. by that river to its junction with the *Po*, and southward of the *Po* by the Adriatic Sea; and on the S. by the chain of the Apennines and the course of the Rubico, *Fiumicino*; it thus comprised the greater part of *Piedmont*, *Lombardy*, and the districts of *Parma*, *Modena*, *Bologna*, and *Ferrara*. The *Po* divided it unequally into Transpadana, the northern, and Cispadana, the southern portion. The course of the Padus, which was called by the Greeks *Eridanus*, and by the Ligurians *Bodencus*, has been already noticed; it was navigable for light craft as high up as Augusta Taurinorum, *Turin*; frequent inundations occurred during the summer months from the melting of the Alpine snows. Its lower course has undergone material alterations, in consequence of the flatness of the surrounding country: in ancient times it divided near *Ferrara* into two main streams; the southern of which was named *Olana* and still *Volano*; the northern, which retained the general direction of the river, *Padoa*: the latter was subdivided before reaching the sea into seven channels, which at an early period were improved by artificial embankments. The tributaries of the *Po*, in Gallia Cisalpina, were—on the left bank, the Duria Major, *Dora*, which rises in the *Little St. Bernard*, and waters the valley of the Salassi; the Ticinus, *Tessino*, which rises in M. Adula, and flows through Lacus Verbanus, *Lago Maggiore*, famed in history for the engagement between the Carthaginians and Romans, B.C. 218, which took place near *Pavia*; the Addua, *Adda*, flowing through Lacus Larius, *Lago di Como*, and joining between Placentia and Cremona; the Ollius, *Oglio*, flowing through Lacus Scabinus, *L. d'Isco*; the Mincius, *Mincio*, which carries off the waters of Lacus Benacus, *L. di Garda*, and flows in a sluggish stream by Mantua; and the Tartirus or Atrianus, *Tartaro*, which forms a connecting link between the Padus and Athesis in their lower courses: on the right bank—the Tanarus, *Tanaro*, rising in the Maritime Alps; the small river Trebia, *Trebbia*, rising in the Apennines and joining the *Po* a little above Placentia, celebrated for the engagement between Hannibal and the Romans, B.C. 218; and the Rhenus, *Reno*, which flows past Bononia, and discharges itself

into the large lagoon formed by the Po: the celebrated meeting between the Triumvirs—Octavianus, Lepidus, and Antony—took place on a small island either in the Rhenus or in its tributary the Lavinius.

The principal tribes and cities in Gallia Transpadana were as follow. The Taurini, whom we have already mentioned as living in Liguria, were found also to the north of the *Po*; their chief town lay on the left bank of the river, and after the time of Augustus, who made it a Roman colony, was named Augusta Taurinorum, *Turin*: Hannibal found it the most important place in those parts: a road led thence across the Cottian Alps by the present pass of *Mont Gendvre*, following the courses of the Duria Minor and of the Druentia, and passing by Segusio, *Susa*, the capital of the Alpine sovereignty of Cottius. The Salassi lived northwards, chiefly in the valley of the Duria Major, and on the southern declivities of the Alps; they were troublesome neighbours to the Romans until subdued by Terentius Varro, who placed a fortified camp in their territory: Augustus afterwards erected a town in this spot for the protection of the road across Mons Penninus, and called it Augusta Prætoria, *Aosta*: Eporedia, *Ivea*, was erected for a similar purpose lower down the course of the Duria. The Libicii lived in the plain of the *Po*, below the Taurini, with the town Verelle, *Vercelli*: then the Lævi and Marici, with the town Ticinum, *Pavia*, on the left bank of that river, near its junction with the *Po*. The Insubres were a powerful tribe, between the Ticinus and the Addua, with Mediolanum, *Milan*, for their capital; this town was taken by the Romans B.C. 222, and rose to great eminence, both as a central point of communication and as the seat of a flourishing university; Laus Pompeii, near *Lodi*, also in their territory, was named after Pompeius Strabo, who planted a colony there. North of the Insubres were the Orobii, in the lake district, with the towns Comum, *Como*, the birthplace of the younger Pliny, at the extremity of Lacus Larius, and Bergōnum, *Bergamo*: from Comum a road led across the Alps by Curia, *Coire*, to Rætia. The Cenomani (whose original seats were about the *Maine*) occupied the plain between the Addua and the Athesis: in this district the Romans erected the important town of Cremōna, *Cremona*, on the *Po*, as a defence against Hannibal; it was fortified and possessed many handsome buildings; Vespasian's army sacked it, A.D. 70, and it never afterwards recovered its prosperity. Verōna, *Verona*, on the right bank of the Athesis, was founded by the Euganei, and afterwards occupied by the Cenomani: it was the birthplace of Catullus, Vitruvius, and the elder Pliny, and one of the finest towns of northern Italy. Brixia, *Brescia*, between the lakes Sebina and Benacus, is one of the few old Etruscan towns which existed in historical times. Mantua, *Mantua*, was built on a small island in the river Mincius: Virgil was born at the neighbouring village of Andes.

Gallia Cispadana consisted of the numerous valleys into which the Apennines break up on their northern side, together with the plain south of the *Po*, from the Trebia to the Adriatic. There was no easy point of access to this country across the Apennines: the Romans entered it usually at its south-eastern extremity, from Ariminum, whence the Via Æmilia, constructed, B.C. 186, by Æmilius Lepidus, led across to Placentia, following generally a line parallel to the hills.

The chief Gallic tribes in this district were—the Anamæres, between the *Po* and the Apennines, south of Placentia; the Boii, in the central district about Parma and Modena; the Lingōnes, in the angle formed by the lower course of the *Po* and the Adriatic; and the Senōnes, along the Adriatic south of Ravenna.

Most of the towns owe their origin to the Gauls, but their prosperity to the Romans. Placentia, *Piacenza*, was built at the same time as Cremona, B.C. 219, as a military post for the defence of the border; its importance, as such, was proved after the battles of the Ticinus and Trebia, when the Roman generals effected their retreat thither: after the construction of the Via Æmilia it rose to great importance. Parma, *Parma*, came next on the Via



*Æmilia*; originally built by the Gauls, it was insignificant until the Romans sent a colony thither, B.C. 183; it suffered much in the civil wars, but was restored by Augustus, with the name *Col. Julia Augusta*. *Regium Lepidum*, *Reggio*, was colonized probably by M. Æmilius Lepidus. *Mutina*, *Modena*, colonized by the Romans, B.C. 183, sustained a long siege in the civil wars; it attained a high state of prosperity, being described by Cicero as ‘*firmissima et splendidissima populi Romani colonia*.’ *Bononia*, *Bologna*, was colonized B.C. 190. *Ravenna*, *Ravenna*, on the coast of the Adriatic, owed its prosperity to its being selected by Augustus as the station for his fleet on that sea; he built a walled harbour, named *Classes*, which he connected by a canal with the *Po*; the marshes by which *Ravenna* was surrounded rendered it impregnable. By the advance of the coast, the modern town stands several miles from the sea.

5. 1. *VENETIA* was bounded on the W. by the *Atlæsis*, on the E. by the small river *Timævus*, on the S. by the *Adriatic*, and on the N. by the *Alpes Carnicæ*: it comprehends the eastern part of *Lombardy*. This country derived its name from the *Veneti*, or *Heneti*, who settled in it, and who were believed by the ancients to be allied to the tribes of the same name in *Paphlagonia* and *Gallia*. No part of Italy was more highly favoured than this; the soil was very productive, and the people pacific both in their temper and pursuits. The Romans annexed it to their empire B.C. 183, chiefly for the purpose of restraining the Gauls: the precise date when it was formally constituted a province does not appear.

The chief rivers were—the *Atlæsis*, *Atesia*, or *Atagis*, *Adige*, on the western boundary, which has its sources in the *Rhaetian Alps*, and flows southwards as far as *Verona*, thence bends round to the east, and discharges itself into the *Adriatic*, north of the *Po*; the *Medoæus*, *Brenta*, consisting of two united streams, *Major* and *Minor*; the *Plavis*, *Piave*, more to the eastward; and the *Tilaventus*, *Tagliamento*.

The chief towns were—*Patavium*, *Padua*, the capital, and the birthplace of *Livy*, on the *Medoæus Minor*, which carried on a considerable trade in woollen stuffs; *Altinum*, *Altino*, on the river *Silis*, near the sea, a depôt for the commerce of northern Europe; and *Aquileia*, *Aquileia*, founded by the Romans B.C. 181, about seven miles from the sea; it was strongly fortified, and carried on a considerable trade. The roads from *Dalmatia*, *Histria*, and *Pannonia* joined at this point.

2. *CARNIA*, or *Carniola*, was the mountainous district to the north of *Venetia* and *Histria*. Its inhabitants were a Celtic race, of whose history we know very little. The Romans planted some military colonies at the entrance of the mountain passes, for the protection of the frontier: such as *Julium Carnieum*, on the upper course of the *Tilaventus*; and *Forum Julii*, *Cividale*, north of *Aquileia*.

3. *HISTRIA*, which still retains its name, was considered, before the time of Augustus, as a part of *Illyria*; it was subdued by *Claudius Pulcher*, B.C. 177. It consisted of the peninsula formed by the diverging horns of the *Adriatic*, viz., the *Sinus Tergestinus*, *Gulf of Trieste*, and the *Sinus Flanaticus*, *Gulf of Fiume*. The *Timavus* separated it from *Venetia*, and the *Arsia* from *Illyria*. The only large towns were—*Tergeste*, *Trieste*, at the head of the western gulf, elevated by *Vespasian* to the rank of a Roman colony, and thenceforward a place of much importance; and *Pola*, or *Pictas Julia*, *Pola*, at the southern point of the peninsula.

6. *UMBRIA*.—Descending southwards from *Gallia Transpadana*, we come to the territory of the ancient and once extensive tribe of the *Umbri*. It has been already observed that the *Rubico* separated it from *Gallia*; it thence occupied the sea-coast southward to the river *Æsis*, *Esino*, where it adjoined *Picenum*. The maritime district is but narrow, the spurs of the *Apennines* protruding to the immediate neighbourhood of the sea. The interior is divided into numerous valleys, ascending to the central range of the *Apennines*; the *Umbri* occupied these, from the sources of the *Tiber* to those of the *Nera*, as

well as the country on the western side of the range between these rivers down to and even below their junction; it thus comprehended the provinces of *Urbino*, *Perugia*, and parts of *Romagna* and *Umbria*.

The streams that descend from the eastern declivities of the Apennines attain no great length; one of them, the Metaurus, *Metauro*, is well known from the engagement in which Hasdrubal lost his life, and which took place on the left bank of the river, near *Fossombrone*. On the other side of the mountains, the Tiber and its tributaries have their sources. The Nera, or Nar, *Nera*, rises in Mons Fiscellus, and descends to the south-west, receiving on its left bank the Velinus and other Sabine streams, and discharging itself into the Tiber: the small Tinia, *Tinia*, rises near Spoletium, receives the sacred Clitumnus, and flows north-west, joining the Tiber below Perugia.

The towns of Umbria were—*Ariminum*, *Rimini*, a flourishing seaport, where the Æmilian and Flaminian roads met; Fanum Fortunæ, *Fano*, on the banks of the Metaurus, originally only a temple (as the name implies), but afterwards made a Roman colony, with the name Col. Julia Fanestrîs; Sontinum, on the Æsis, the scene of a battle between the Romans and the Samuites; Mevania, *Beragna*, on the Tinia, in a most fruitful district; Spoletium, *Spoletto*, founded by the Romans B.C. 241, on the Flaminia Via; Narnia, *Narni*, on the left bank of the Nar, strongly posted on a rock, built by the Romans B.C. 300, on the site of the ancient Nequinum; Interamna, *Terni*, higher up the Nar, and surrounded by it; and Tuder, *Todi*, an old Umbrian town, on the left bank of the Tiber.

7 ETRURIA bordered on the *Mare Inferum* from the Tiber in the S. to the Macra in the N. The central chain of the Apennines to the sources of the Tiber, and the course of that river thence to the sea, formed its eastern and southern boundaries; on this side it was contiguous to Umbria, the Sabini, and Latium. It corresponds generally with the modern state of *Tuscany*.

Etruria consists of the following districts, widely different in character and climate: (1) the sea-coast, which is marshy and unhealthy; (2) the rich valleys of the Arnus, Umbro, and Tiber, productive of every species of grain; and (3) the wooded heights of the Apennines, and the numerous off-sets that branch from them. These secondary ranges are very irregular in their courses, and produce a corresponding irregularity in the direction of the valleys: in the interior they run rather parallel to the central chain, from N. to S.; nearer the sea, however, their direction is from E. to W.

The lakes form a remarkable feature in the geography of this province; they are for the most part environed with hills, having but one approach, and in some cases no visible outlet: such are the Lacus Trasymenus, *L. di Perugia*, south of Cortona, which was approachable only on the northern side, the scene of Hannibal's victory, B.C. 217; L. Volsiniensis, *L. di Bolsena*, near Volsinii, which had an outlet by the river Marta; the small L. Vadimonis, near *Bassano*, now filled up with reeds and peat, between Ciminus Mons and the Tiber, the scene of the defeat of the Etrurians, B.C. 310: L. Ciminus, *L. di Ranciglione*; and L. Sabatinus, *L. di Bracciano*, north of Veii, whence an aqueduct conveyed a supply of water to Rome.

The chief rivers of Etruria were the Arnus, *Arno*, in the north, rising in the Apennines, and flowing with a general direction to the west; near its mouth it receives a tributary, the Auser, from the north; the Umbro, *Ombrone*, of much shorter course than the Arnus; the Clanis, a tributary to the Tiber, which rises westward of the Trasymene Lake, and runs in a valley which seems to belong equally to the basins of the Arnus and the Tiber, forming a long marsh or lake, the Palus Clusina, which had an outlet into both rivers, but chiefly by the Clanis into the Tiber; and lastly, the small but celebrated Creméra, *La Valca*, which rises near Veii, and joins the Tiber north of Rome.

Etruria abounded in wealthy and strong towns, the remains of which at this day are very extensive. They were situated almost without exception on hills or cliffs overhanging a stream, and sometimes at the junction of two

streams. The walls were of a Cyclopiian character, but of a more advanced style than the Pelasgic walls of Tiryns and Mycenæ; the stones being hewn, and fitted in horizontal courses. Twelve of the chief towns formed a confederacy: the names are stated variously, changes probably having occurred by the decay of some, and the introduction of others in their place. The generally received list includes Cortona, Perugia, Arretium, Volsinii, Tarquinii, Clusium, Volaterræ, Rusellæ, Vetulonia, Veii, Cære, and Falerii.

The most important towns in Etruria were—Luna, on the left bank of the Macra, with a spacious natural harbour at the mouth of the river; its walls were built of solid marble, taken from the famous Carrara quarries; Luca, *Lucca*, on the river Auser, made a Roman colony B.C. 177; Pisa, *Pisa*, at the confluence of the Auser and Arnus, with a harbour at the mouth of the latter, whence a considerable trade with Sardinia and Gaul was carried on; Fiesulæ, *Fiesole*, situated at the entrance of a pass across the Apennines, on the line of the modern road from Florence to Modena; Florentia, *Florence*, on the right bank of the Arnus; Arretium, *Arezzo*, in the upper valley of the Arnus, celebrated for its manufacture of arms and terra-cotta vases, as well as for its vineyards, and important in a military point of view, as commanding the southern route to the valley of the Clanis; Cortona, *Cortona*, about fourteen miles south of Arretium, and to the north of the Trasymene Lake; Volaterræ, *Volterra*, called also Velathri, strongly posted on the flat summit of a hill overlooking the maritime plain; its walls were seven miles in circumference, and the town ranked as the largest and strongest in Etruria; it withstood Sylla for two years; Vetulonia to the south, on the small river Lynceus, not far distant from the sea; Populonium, *Porto Baratto*, the port and arsenal of the Etruscans, just opposite *Elba*; Rusellæ, in the valley of the Umbro; Clusium, the ancient Camers, at the southern extremity of the Palus Clusina, the capital of Porsenna; Perugia, *Perugia*, between the Trasymene Lake and the Tiber, celebrated for the long siege it sustained against Augustus; Volsinii, *Bolsena*, on the lake named after it, the most wealthy and luxurious of the Etruscan cities; Cosa, on the sea-coast, one of the naval stations of the Romans; Tarquinii, on the Marta, the birthplace of Tarquinius Priscus, and in his time probably the metropolis of the Etruscan confederacy; Falerii, *Civita Castellana*, the capital of the Falisci, which was besieged by Camillus, B.C. 395; Capena, *Civitavecchia*, a colony from Veii, about five miles from the Tiber; Veii, *L'Isola Farnese*, a fortified town on a cliff overhanging the Cremera, which was taken by Camillus, B.C. 395; Cære, called by the Greeks Agylla, a Tyrrhenian settlement near the coast, well known for the hospitality with which its inhabitants received the Romans at the time of the Gallic invasion; and Centumcellæ, *Civita Vecchia*, where Trajan constructed a magnificent harbour.

Off the coast of Etruria lies the island of Æthalia or Ilva, *Elba*, the iron mines of which were known to the ancients.

8 PICENUM adjoined Umbria, along the coast of the Adriatic, extending southwards to the river Matrînus, *Piomba*; inland it was bounded by the territories of the Sabini and Marsi: it is now a portion of *Abruzzo Ultra*. In general character it resembles Umbria, being broken up into numerous small valleys, and possessing a fertile soil. The Via Salaria formed the line of communication with Rome.

The most important towns were—Ancōna, *Ancona*, a seaport, which was founded by Syracusans, B.C. 359, and so named from its position on an elbow or promontory; Firmum, *Fermo*, about five miles from the sea, which possessed a fortified harbour, named Castellum Firmanum; Ascūlum, *Ascoli*, a strongly fortified town on the Truentus, which sustained a severe siege against Pompey in the Social War; and Auximum, *Osimo*, on the Miscus, also strongly fortified.

9 The SABINI, MARSI, PELIGNI, VESTINI, and MARRUCINI. These tribes are grouped together, as being allied in race, and contiguous in abode: they

occupied the districts on both sides of the Apennines, from the borders of Etruria, Umbria, and Picenum in the N., to Latium, Samnium, and Apulia in the S.

1. The district of the **SABINI** was bounded on the N.W. by the Nera, on the S.W. by the Tiber, on the S. by the Anio, and on the E. by the central chain of the Apennines: it is still called *Sabina*.

The chief river is the Velinus, *Velino*, which rises in the high Apennines, receives a considerable tributary, now called the *Salto*, from the district of the Marsi, and empties itself into the Nera: the lower valley about Reate was liable to inundations, until Curius Dentatus formed an artificial course, which terminates in the celebrated falls of *Terni*. This valley was the original seat of the Sabines: their metropolis was the town abovementioned, Reate, *Rieti*, which was surrounded by a most fertile country. The Via Salaria passed through it, and the sulphureous springs in its neighbourhood led to its being much frequented by the wealthy Romans. There were many other towns in this and the adjacent valleys in the days of Sabine independency, which disappeared at an early period.

The part of the country best known to us lies in the vicinity of Rome, and abounds with spots of historical interest: here were situated the Mons Sacer, a low range at the junction of the Anio and Tiber, whither the Roman plebs seceded; Fidene, on the Tiber, an early opponent of Rome; the brook Allia, on whose banks the Romans were defeated by the Gauls, b.c. 389; Nomentum, *Lamentana Vecchia*, on the Via Salaria, with excellent vineyards about it; Cures, *Corresse*, the birthplace of Numa Pompilius; and many other places mentioned in the early history of Rome.

The only towns of interest in the eastern part of this province were—Nursia, situated on a spur of the Apennines, near the valley of the Nera; and Amiternum, near *Aquila*, on the eastern side of the main ridge of the Apennines, in the valley of the Aternus.

2. The **MARSI** dwelt about the Lacus Fucinus, *Lago di Celano*, and in the high mountain district which contains the sources of the Liris and the *Salto*. The barren and wild character of this small province contributed to the formation of the character of its inhabitants; they were brave, hardy, and independent, and offered a stout resistance to the arms of Rome; they were also much given to superstitious practices, and were adepts in the art of charming serpents, a practice still in vogue among the occupants of this region.

The Lacus Fucinus is surrounded by the highest peaks of the Apennines, the bases of which protrude for the most part to the very edge of the lake, but in some few spots leave a narrow plain: it is about thirty miles in circumference; occasionally its waters rose so high as to inundate the shores; to prevent this, an emissary was constructed by Claudius, which carried the superfluous waters to the Liris. The towns of the **Marsi** were—Marrubium, *St. Benedetto*, on the eastern shore of the lake; and Alba Fucentina, made a Roman colony b.c. 303, and from the strength of its position selected as the site of a state-prison. The celebrated Lucus Angitia has left a trace of its name in the village of *Iuco*, on the south-western shore.

3. The **VESTINI** are sometimes included in Picenum: they did not, however, come within the limits we have assigned to that province, but lived adjacent to it, occupying the sea-coast from the Matrinus to the Aternus, and inland to the chain of the Apennines. The general character of this district is mountainous; but the gradually declining ridges leave a maritime plain of about ten miles width, remarkably fertile in grain and fruit. The chief river is the Aternus, *Pescara*, which rises near the Sabine town of Amiternum, and descends first towards the south-east and then to the north-east, falling into the Adriatic near a town of the same name, Aternum, *Pescara*. The chief town was Pinna, *Civita di Penna*, in the centre of the district, which was besieged by the Romans in the Social War.

4. The **PELIGNI** held a small mountainous district, adjoining the Marsi,

and south of the Aternus. A valley which supplies a tributary to that river contained their towns of Corfinium, *St. Pelino*, and Sulmo, *Sulmona*. The former stood near the Aternus, and commanded the road which crossed the Apennines from the Marsi to the Adriatic; from its own strength and its favourable position, it was selected as the head-quarters of the allies in the Social War. Sulmo, higher up the valley, is chiefly known as the birthplace of the poet Ovid; it suffered severely from a siege by Sylla.

5. The MARRUCINI occupied a narrow district on the right bank of the Aternus from the Peligni to the sea. The only town of importance was Teate, *Chieti*, on the bank of the river, a large and prosperous place: the valley produced a superior kind of fig.

10. LATIUM.—The earliest notices that we have of Latium apply the name only to a small portion of the plain which stretches southwards from Rome. In the time of the later kings, it was co-extensive with the Roman dominion, embracing the whole of the plain to Antium and the Volscian hills; and this was afterwards known as Latium Antiquum. When the Romans advanced their conquests beyond the hills, they included the territories of the Volsci, Æqui, Hernici, and Aurunci under that name, or, as it was more properly termed, Latium Novum or Adjectum.

In its widest extent, then, Latium was bounded on the N. by the Tiber and the Anio, on the E. by the districts of the Marsi and Samnites, on the S. by Campania, and on the W. by the Mare Inferum: it corresponds with the modern province of *Campagna di Roma*, with part of *Terra di Lavoro*. It consists of two districts widely differing in appearance and character—the undulating plain which stretches from the Tiber southwards along the coast of the Mediterranean to Circéi; and the hilly country which bounds that plain, and contains the valleys of the Liris, the Treerus, and the Anio. The range which separates these districts extends from Tibur on the Anio, to the sea near Tarracina, and is interrupted only in one spot, near Praeneste, where access is given to the valley of the Treerus. The Æqui occupied the northern half of this range, and the Volsci the southern half, with the plain adjacent to it; the Hernici lived behind the range in the valley of the Treerus. These districts we shall now describe more minutely, with the towns belonging to them.

1. The LATINI held the undulating plain from the Tiber and the sea to the hills just described. This plain is broken by the Alban hills, which rise in an isolated group at a distance of about fourteen miles from Rome; they are volcanic in their formation; the loftiest was called Mons Albānus, *Monte Cavo*, and possessed a temple sacred to Jupiter Latiaris; the Ferie Latine were celebrated on it. Under this hill is a lake, Albanus Lacus, in the crater of an extinct volcano; to check the inundations which were caused by the overflow of its waters into the plain, an emissary was constructed, B.C. 397, to the Tiber. There is another smaller lake to the south, the modern name of which, *Nemi*, is derived from the sacred grove, Nemus Dianæ, on its banks.

In this district was Roma, *Rome*, the capital of Italy and of the ancient world, situated on the left bank of the Tiber, about sixteen miles from the sea. The city of Romulus stood on the Palatine hill; under the early kings it extended to the neighbouring heights of Velia, Cermalus, Cælius, Fagutal, Oppius, and Cispius, which, with the Palatine, made up the original seven hills (Septimontium) of Rome. Another city meanwhile, inhabited by Sabines, was erected on the Capitoline, Quirinal, and Viminal hills, and the union of these two cities by Servius Tullius brought Rome to its full extent. The relative position of the seven well-known hills on which the enlarged city stood, is the most important feature in the topography of ancient Rome. Three of them, the Quirinal, Viminal, and Esquiline, are grouped together, being in fact projections from the same high back-ground; the Esquiline is the most southerly of the three, parallel to which, with a shallow valley intervening, rises the Cælian, an oblong hill curving slightly inwards. The Palatine is, as it were, the *focus* to which these several hills point, while two detached

heights, the Capitoline and the Aventine, are situated respectively north and south of it, occupying the ground that intervenes between the group and the river Tiber. The highest of these hills, the Esquiline, is about one hundred and sixty feet above the level of the river. The Tiber has a serpentine course, bending inwards, so as to touch the bases of the Aventine and Capitoline, and then outwards with a considerable sweep, enclosing the Campus Martius.

We shall briefly describe these hills, with the position of the most remarkable buildings and streets. The Capitoline has a double summit, the southern of which is the famous Tarpeian rock, on which the temple of Jupiter Capitolinus stood; the northern is the site of the ancient Capitol; the dip between the extremities, called Intermontium, contained the Asylum of Romulus, the Tabularium, or Record Office, and other public buildings. The Forum, now *Campo Vaccino*, was situated between the Capitoline and Palatine; from its low position it was originally swampy, but it was drained by Tarquinius Superbus, who constructed the Cloaca Maxima for the purpose: it was rectangular in shape, and surrounded by temples and statues. Along the eastern side of the Forum, the Via Sacra conducted in one direction to the Capitoline, in the other, along the valley between the Esquiline and Palatine, to the Flavian Amphitheatre, more commonly known as the Colosseum, and thence to the Porta Capena. The Via Sacra was lined with official residences, chapels, and statues, and constituted the most frequented promenade; near the Colosseum was the fashionable quarter called Carinæ, now *Pantani*. The Vicus Cyprius led from Carinæ to Subura, the most crowded quarter of the whole town, lying in the hollow between the Quirinal and Esquiline. The Esquiline was crowned with the Baths of Titus; beyond which, outside the walls of Servius, were the Gardens of Mæcenæ. The Quirinal was similarly occupied by the Baths of Diocletian and the Gardens of Sallust, both of which were within the walls, adjoining the Porta Collina. Collis Hortorum, so called from the number of gardens about it, is now the *Pincian* hill. The Campus Martius was for a long period a vacant space outside the walls, used for public amusement and exercise; the emperors, however, and particularly Augustus, erected numerous public buildings on it, among which the Pantheon, built after the battle of Actium; the Mausoleum Augusti, in which Marcellus and others were interred; the Septa Julia, in which the centuries gave their votes; and the Circusses of Domitian and Flaminius, were conspicuous. Returning into the city, the summit of the Palatine is remarkable as the favourite residence of the emperors Augustus, Tiberius, Caligula, and Domitian; as also of many illustrious citizens, Cicero, Mark Antony, Hortensius, and the Gracchi. Between the Palatine and Aventine lay the Circus Maximus, originally erected by Tarquinius Priscus, and enlarged at various times by Cæsar, Augustus, Claudius, and Trajan; it was an oblong building, rounded at its southern extremity, and large enough to accommodate 385,000 spectators. A series of porticoes surrounded it, with shops under the arcades. Outside the Porta Capena stood the splendid Baths of Antonine; and a little farther on, the Monument of the Scipios. Here too was the valley of Egeria, with the small stream Crabra, *Aqua Santa*.

The other important towns of the Latini were—Ostia, the port of Rome, at the mouth of the Tiber, with salt marshes in its neighbourhood; Laurentum, *Paterno*, the capital of Latinus, about sixteen miles to the eastward of Ostia; Lavinium, *Pratica*, which fell early into decay; Ardea, *Ardea*, the capital of the Rutuli, on an eminence near the sea; Lanuvium, *Lavigna*, on the most southerly of the Alban hills, the native place of the Antonines and many other famous Romans; Aricia, *La Riccia*, at the foot of Mons Albanus, which retained its importance under the Roman empire, partly through its beauty and fertility, partly through the celebrated grove and lake of Diana in its immediate neighbourhood; Alba Longa, on a spur of the Mons Albanus, and on the north-eastern edge of the lake; Tusculum, *Frascati*, on the most northern of the hills, the residence of many celebrated men, particularly Cicero, Mæcenæ, and Lucullus; Gabii, about twelve miles from Rome, a

colony from Alba: Præneste, *Palestrina*, an important post, commanding the entrance to the valley of the Trerus, and possessing a celebrated temple, sacred to Fortune, with an asylum; and Tibur, *Tivoli*, on the Anio, renowned for its beauty, which attracted thither Mæcenas, the emperor Hadrian, and other illustrious men; it is further interesting as the abode of Syphax and Zenobia.

2. The *ÆQUI* or *Æquicōli* occupied the upper valley of the Anio, with the hilly country adjacent to it, between the territories of the Latini on the W., the Sabini on the N., the Marsi on the E., and the Hernici on the S. They were the constant foes of the Romans down to their subjugation, B.C. 303. The only town of importance was Caracēli, on the Via Valeria, where the Romans were in the habit of placing hostages and state-prisoners.

3. The *HERNICI* lived between the Æqui and the Volsci, in the valley of the Trerus and on the hills to the north of it. The Trerus is a tributary to the Liris, rising near Præneste and flowing towards the S.E. The chief town of the Hernici was Anagnia, *Anagni*, well situated on a spur of the hills which bound the valley on the N. The Via Latina passed through it, which led to its being frequently attacked by the enemies of the Romans. Ferentinum, *Ferentino*, and Frusino, *Frosinone*, were towns of less importance, similarly situated on the Via Latina.

4. The *VOLSCI* occupied a larger portion of Latium than any of the tribes already mentioned. On the W. they held the sea-coast from Antium to Tarracina; on the E. their territory advanced to the border of Samnium; they occupied the valley of the Liris northwards to the country of the Marsi; and on the side of the Latini they held the mountain district that bounds the Latin plain.

The chief river was the Liris, *Garigliano*, which rises near the Lacus Fucinus, and reaches the sea at Minturnæ: the Trerus is its chief tributary. Several small streams descended from the Volscian hills into the maritime plain, and were there absorbed in a large marsh, well known under the name of Pomptinæ Paludes. In the days of Volscian independence, this plain had been carefully drained, but after the destruction of the towns on it, the rivers stagnated there. Many attempts were made by the Romans to remedy this evil, particularly by Corn. Cethegus and Julius Cæsar. Augustus succeeded to great extent by the construction of a canal, which served the double purpose of drainage and navigation: it ran parallel to the Via Appia from Appii Forum to Tarracina.

The chief town of the Volsci was Antium, *Porto d'Anzo*, situated on a rocky promontory near the border of the Latini, with a port named Ceno close by; in the time of the Roman kings it possessed great maritime power, and did the Volscians good service with its fleet; it was finally conquered B.C. 338, and the beaks of its vessels were carried to Rome and placed in the Forum. The other places of interest were—Velitræ, *Velletri*, just below the Alban hills, the birthplace of Augustus; Astūra, on the coast below Antium, the country residence of Cicero; Circēii, on a high peninsular rock overhanging the sea, named M. Circæus, *Monte Circeo*, frequently mentioned in the early wars of Rome; Anxur or Tarracina, *Terracina*, on the summit of a hill, which commanded the Appia Via on one side, and overlooked the sea on the other; Aquinum, *Aquino*, the birthplace of Juvenal, in the valley of the Liris; and Arpinum, *Arpino*, higher up the same valley, the native place of C. Marius and of Cicero, who possessed an estate in the neighbourhood.

5. The territory of the *AURUNCI* extended along the sea-coast from near Anxur to the border of Campania; inland it was separated from the Volscian district by a chain of hills, which terminated at the valley of the Liris. On the western boundary these hills approach the sea-coast, and formed a narrow pass near Lautūla, through which the Appia Via went; this pass was occupied by Fabius Maximus in the second Punic war. The territory of the Aurunci, particularly the Ager Cæcubus, yielded excellent wine.

The chief towns were—Fundī, *Fondi*, near a lake of the same name; Cajēta, *Gaeta*, on a promontory which enclosed on the W. the gulf named after it, Sinus Cajetanus, *Gulf of Gaeta*; Formiæ, *Mola*, on the shores of the gulf, where Cicero possessed a villa, in which he was put to death; and Minturnæ, near the mouth of the Liris, with considerable marshes about it, in which Marius took refuge.

II CAMPANIA was bounded by the Mare Inferum on the W., the river Silarius on the S., Samnium on the E. and N.E., and Latium on the N.W. Mons Massicus, *Montedragone*, celebrated for its vineyards, separated it from the latter; and a line of isolated heights, Tifatī Montes, *Maddaloni*, Taburnus, *Taburno*, and others, separated it from Samnium: it corresponds with the province of *Terra di Lavoro*, with a part of *Principato Citra*.

Besides the hills already mentioned, there are others of greater importance: such as Lactarius, on the southern side of the Sinus Cumanus; Gaurus, a volcanic range, on the opposite side of the bay, between Cumæ and Neapolis; and particularly the celebrated Vesuvius, which rises not far from the centre of the bay: the frequent eruptions of this mountain have altered its own form as well as the line of the neighbouring coast: Strabo describes it as having a level summit, and there is little doubt that the ridge now called *Somma* is the ancient top, the conical elevation above that being of comparatively modern formation: the changes on the coast are marked by the position of Herculaneum and Pompeii, which formerly stood by the sea, as well as by the altered course of the river Sarnus. To the north of Mons Gaurus there is a considerable plain, stretching as far as the Vulturnus, to which, in all probability, the name Campania (from *campus*) was originally applied; the southern part of this, near Cumæ, was of a volcanic character, and was thence named by the ancients Phlegræi Campi (the *burning fields*), Laborinus Campus (whence the modern name, *Lavoro*, is derived), or Area Vulcani. The effects of volcanic agency are particularly visible in this neighbourhood: near Cumæ was the Lacus Avernus, in an extinct crater, deemed the entrance to the volcanic regions from the mephitic exhalations that rose from its surface; close by was the Lacus Lucrinus, which has been almost filled up by a volcanic mountain, *Monte Nuovo*, which suddenly rose up A.D. 1538: Agrippa connected these lakes with each other and the sea by opening channels between them, and thus constructed a double harbour, which he named Portus Julius.

The rivers of Campania were—the Vulturnus, *Voltorno*, which rises in Samnium, and, in its upper course, flows towards the S.E., but, after its junction with the Calor, turns abruptly to the W., and having skirted the base of the Tifatī Montes, crosses the plain to the sea; the Sarnus, *Sarno*, which rises in Mons Taburnus, and discharges itself into the Sinus Cumanus, near Pompeii; and the border stream of Silārus, *Sele*, the upper course of which belongs to Lucania.

The beauty of Campania, the luxuriousness of its climate, and the fertility of its soil, rendered it the favourite residence of the wealthy citizens of Rome.

The coast of Campania abounded with prosperous towns. Cumæ was the most ancient, and, at one time, the most powerful city in these parts: it was founded by Æolians, B.C. 1030, and, in turn, it founded Puteoli, Messana, and Neapolis: its chief celebrity arose from the oracle of the Sibyl; Baiæ, *Baia*, near Prom. Misenum, was much frequented for its mineral waters; Puteoli, *Pozzuoli*, on the opposite side of a small bay, possessed a good port, whence a considerable trade with the East was carried on: sulphureous springs were common in this neighbourhood, and are said to have given rise to the name of Puteoli, the place having originally been called Dicæarchia: eastward of Puteoli, a spur of Gaurus, named Colles Leucogæi, approaches so close to the shore as to intercept the road: a tunnel was made through this by the command of M. Agrippa, and still exists under the title of the *Grotto of Posilippo*, which it derives from the celebrated villa of Pausilypon, erected by Augustus near it: over the tunnel is the building reputed to be Virgil's



tomb; Neapolis, *Naples*, stood at the north-eastern angle of the Sinus Cumanus: it was originally named Parthenöpe, and probably derived its more modern name from some additions that were made to it after the Samnite conquest of Campania; Herculaneum and Pompeii were farther down the coast: they were overwhelmed by an eruption of Vesuvius, A.D. 79, which proved fatal to the elder Pliny; Salernum, *Salerno*, was the last town of importance on the coast: it was colonized by the Romans, B.C. 194, and was the chief town in the territory of the Picentini, who were settled in the southern part of Campania. The chief towns in the interior were—Teānum, *Teano*, surnamed Sidicinum, from its being the capital of the Sidicini, in the northern part of the province; Casilinum, *Capua*, on the Volturnus; and Capua, *S. Maria di Capua*, a short distance from the left bank of that river, the chief town of northern Campania, and historically famous for the fatal influence which its luxurious climate had upon the Carthaginian army.

Off the coast of Campania lie the islands of Prochyta, *Procida*, Pithecüsä, *Ischia*, and Caprea, *Capri*, the last of which has obtained an unfortunate celebrity as the scene of Tiberius' debauchery.

- 12 SAMNIUM was an irregularly shaped province, lying on both sides of the Apennines, and bounded by Latium and Campania on the W., Apulia and the Frentani on the E., Lucania on the S., and the Marsi and Peligni on the N.; it comprehended *Principato Ultra*, *Sanneo*, and part of *Abruzzo Citra*.

The Apennines attain their greatest extent and elevation in this province, and present the appearance of a solid wall of rock, rising out of the plain; their lower regions are clothed with belts of forest, while the uplands afford excellent pasturage during the summer months. The valleys on the western side of the central range are watered by the Volturnus, *Voltorno*, and its numerous tributaries, the chief of which is the Calor, *Calore*; those on the eastern side by the upper courses of the Sagrus, *Sangro*, Tifernus, *Biferno*, Frento, *Fortore*, and Aufidus, *Ofanto*, which flow into the Adriatic. The inhabitants of Samnium were brave and warlike, and for a long period withstood the Roman power; they were divided into three clans, the Caraceni in the N., the Pentri in the centre, and the Hirpini in the S.; to these a fourth is sometimes added, the Caudini, who are more properly regarded as a subdivision of the Pentri.

The chief towns were—Aufidēna, *Alfadena*, the metropolis of the Caraceni; Æsernia, *Isernia*, near the source of the Volturnus; Venāfrum, *Venafro*, celebrated for its oil, on the right bank of that river; Bovianum, *Boiano*, near the source of the Tifernus; Beneventum, *Benevento*, in the valley of the Calor, one of the oldest towns of Italy, and of importance from its position on the Appia Via; it received a colony from Rome B.C. 268, when its former ill-omened title of Maleventum was abolished; and Caudium, *Costa Caudā*, between Beneventum and Capua, situated near a defile (Furculæ Caudinæ) of Mons Taburnus, in which the Romans were ignominiously defeated B.C. 321; the defile has been identified with the valley of *Arpaia*. The celebrated sulphureous lake of Amsanctus lay in a valley of the same name, eastward of Beneventum.

- 13 APULIA, in its widest extent, was bounded on the N. by the Frento, on the W. by the Apennines, and on the E. and S. by the Adriatic Sea: it thus included the whole of the Iapygian peninsula, and comprehended *Capitunata*, *Bari*, and *Otranto*. More strictly, however, Apulia applied only to the northern portion of this district, from the Frento to the spot where the Apennines approach the sea in the neighbourhood of Egnatia, the peninsula itself being distinguished as Calabria or Iapygia.

Apulia proper consists of an extensive plain, extending from the mountains to the sea, and crossed by numerous streams, of which the Aufidus is the most important. The coast is low and regular, with the exception of the remarkable promontory or cluster of hills named Garganus. The southern district on the other hand is mountainous, being traversed by an offshoot of the Apennine range, which emanates from the central chain near Venusia,

and as it approaches the sea gradually expands, and covers the whole of the peninsula: this high ground terminates in Prom. Iapygium, *C. di Leuca*. The population was of a mixed character, Illyrians and Greeks having settled among the old Ausonians. The territorial divisions were named after the inhabitants, Apŭli being retained as the general title: these divisions were four in number—Daunia from the Frento to the Aufidus, Peucetia thence to Egnatia, Calabria along the eastern coast of the peninsula, and Messapia along the western, including the district of the Salentini near Prom. Iapygium.

The chief towns were—Sipontum, *Siponto*, a sea-port, south of M. Garganus; Salapia, *Salpi*, on a large lagoon more to the south; Arpi, *Arpi*, said to have been founded by Diomedes, whose memory was retained in the name given to the surrounding plain, Campus Diomedis; Canusium, *Canosa*, on the right bank of the Aufidus, where the Romans took refuge after their defeat at Cannæ, which lay about five miles lower down the river; Venusia, *Venosa*, the birthplace of Horace, close under the Apennines; Barium, *Bari*, a fishing station, and the chief town in Peucetia; Egnatia, *Agnazzo*, in Calabria, where the Via Egnatina came upon the sea-coast; Brundisium, *Brindisi*, the well-known port whence the Romans crossed over to Greece, and the terminus of the Appia Via; Hydruntum, *Otranto*, more to the south, also possessing a good harbour; and Tarentum, *Taranto*, at the head of the fine gulf which was named after it, originally founded by Iapygians, but occupied by a Lacedæmonian colony B.C. 707, and afterwards the most powerful city in Magna Græcia: it possessed a small but eminently productive plain.

Two roads connected Apulia with Rome—the Via Appia, which entered the province near Venusia, and crossed the Apennines to Tarentum, whence it was continued to Brundisium; and the Via Egnatina, which parted from the Via Appia at Beneventum, and crossed the plain by Æcæ and Canusium to Barium and Egnatia, and so on to Brundisium.

14 LUCANIA, which is supposed to derive its name from the Greek word λευκός, 'white,' in reference to the limestone rocks common in that province, was bounded on the E. by the Sinus Tarentinus, from the Bradanus, *Brandano*, to the Crathis, *Crati*; on the W. by the Mare Inferum from the Silarus, *Sele*, to the Laüs, *Lao*; on the N. by Samnium and Apulia; and on the S. by Bruttium: it comprehended *Basilicata*, the greater part of *Principato Citra*, and a part of *Calabria Citra*.

The Apennines intersect it in all directions, and approach very near the coasts, only leaving small maritime plains about the mouths of the rivers; they do not, however, obtain the height of the Samnite mountains. On the borders of Apulia rises the lofty hill named Vultur, whence the south-east wind was called Vulturinus. The rivers are necessarily of short course; the Silarus, on the border of Campania, receives two tributaries from Lucania—the Tanäger, *Negro*, remarkable for having a subterraneous course for some miles, and the Cälor, *Calore*; on the eastern coast, the Aciris, *Agri*, flowing into the Tarentine Gulf, is the most important; the Siris, *Sinno*, lower down the coast, is known from the battle which took place on its banks between Pyrrhus and the Romans; the Crathis, on the frontier of Bruttium, receives on its left bank the Sybaris, *Sibari*, and higher up, near Consentia, the Achæron, *Mucone*, on the banks of which Alexander of Epirus perished.

The most flourishing towns of Lucania were the colonies planted by the Greeks along the sea-coast. Metäpontum, at the mouth of the Casuentus, is said to have been founded by Pylians on their return from Troy; it attained considerable prosperity, but sunk after the Punic wars. Heraclæa, *Polycoro*, on the Aciris, was founded by Tarentines, and was the place where the Greek colonists held their congress. Sybäris, at the junction of the Crathis and Sybaris, was founded B.C. 720, by Achæans and Trezenians, and speedily became a most powerful and luxurious place; it perished B.C. 510, in a war with the neighbouring city Crotona; near its site Thurii was erected, B.C. 446, by the remains of the Sybarite population, reinforced by new colonists from

Greece, and speedily rose to eminence; it was plundered by Hannibal, and restored by the Romans B.C. 190, with the name Copia. On the western coast there were—Buxentum, *Policastro*, a colony from Messina B.C. 467; Elea, or Velia, from Phocæa B.C. 553, the birth-place of Parmenides, and the seat of the Eleatic school of philosophy; and Posidonia, better known by the later name of Pæstum, *Pesto*, founded by the Sybarites B.C. 582, famed for its roses, and for the remains of its temples.

15 BRUTTIUM occupied the southern extremity of the peninsula, from the rivers Latis and Sybaris, comprehending the modern divisions of *Calabria Citra* and *Ultra*.

It is throughout mountainous; there is, however, a remarkable interruption in the Apennine range between the Sinus Lameticus and S. Scylaceus, which approach within twenty miles of each other, with low ground intervening: the ridge to the south of this was named Mons Sila. The streams are short and unimportant.

The chief towns of Bruttium were Greek colonies. Crotōna, *Cortrone*, situated on the eastern coast, was the most flourishing: it was founded by Achæans, B.C. 710, and attained great celebrity as the seat of the Pythagorean school: it suffered severely in a contest with the Locri, and sunk into insignificance about the time of the Punic wars. Scyllacium, *Squillace*, a short distance from the bay named after it, was founded by Athenians; Caulonia, *Castel Vetere*, lower down the coast, by Crotonians; both were destroyed by Dionysius the Elder, and afterwards restored, but without regaining their former prosperity. Locri, *Pagliapoli*, the capital of the Locri Epizephyrii (so called from the neighbouring Prom. Zephyrium), was founded by Opuntian Locrians, B.C. 683; though it did not possess a harbour, it nevertheless attained considerable prosperity before its capture by Dionysius the Younger. Rhegium, *Reggio*, founded by a mixed colony of Chalcidians and Messenians, B.C. 688, owed its chief importance to its position in reference to Sicily, as being the usual point for the passage from Italy to that island; it was taken and plundered by Dionysius the Elder, after a siege of eleven months; and though afterwards restored, its former prosperity never returned; it suffered from frequent earthquakes, as well as from the effects of the civil war. Hipponium, Vibo, or Valentia, *Bivona*, was the only Greek town of importance on the western coast; it was founded by Locrians, and destroyed by Dionysius the Elder, who transported its inhabitants to Syracuse. Pandosia, the ancient capital of the Cænotrians, was situated on the river Acheron, probably at *Castel Franco*. Consentia, *Cosenza*, the capital of the Bruttii, stood on a height near the source of the Crathis.

16 The Roman roads form an important feature in the geography of ancient Italy, and therefore deserve particular notice. The Via Latina led southwards from Rome, by Anagnia and Ferentinum, to Casilinum, where it joined the Via Appia. The Via Appia, formed by Appius, B.C. 312, crossed the plain of Latium by the Alban hills to Tarracina, thence followed the line of the sea-coast to Sinuessa, and there struck inland to Casilinum and Capua, which formed the original terminus. Augustus afterwards continued it to Brundisium, by Beneventum, Venusia, and Tarentum. From Beneventum, a branch struck off to the eastward, by Æquum Tuticum and Canusium, to Egnatia, and along the coast to Brundisium; this was called Via Egnatina, or, as some suppose, Via Trajana, from its having been restored by the emperor Trajan. The Via Ardeatina led to Ardea; the Via Ostiensis, along the left bank of the Tiber, to Ostia; the Via Labicana to Labicum, and onward to the station Ad Pietas on the Via Latina; the Via Prænestina through Gabii to Præneste; the Via Tiburtina to Tibur, whence the Via Valeria was constructed to Carseoli, Alba Fucientia, Corfinium, and the shores of the Adriatic; and the Via Nomentana to Nomentum and Eretum. The Via Salaria followed the course of the Tiber to Eretum; thence it struck into the interior to Reate, crossed the Apennines to Asculum in Picenum, and joined the coast road, which led in one direction to Ancona, in the other to Hadria.

The Via Flaminia was the great northern road, which communicated with Gallia Cisalpina; it was constructed, B.C. 221, by Flaminius the Censor; it crossed the Tiber by the Milvian bridge into Etruria, and recrossed it at Oericulum, and led thence by Narnia and Spoletium across the Apennines to the valley of the Metaurus, by which it descended to Fanum Fortunæ. The Via Æmilia, starting from the latter place, and following the coast to Ariminum, struck across Gallia Cispadana to Placentia. The Via Cassia and the Via Claudia were connected with the Via Flaminia as far as the Milvian bridge, and about six miles from Rome they branched off,—the former to Sutrium, Volsinii, Clusium, Arretium, and Florentia; the latter to Sabate, Sena Julia, and Luca. Lastly, the Via Aurelia followed the coast of the Mare Inferum by Centumcellæ, Pisæ, Luna, and Genua to Gaul.

## II. Sicilia, Sardinia, and Corsica.

I SICILIA, *Sicily*, one of the most important islands in the ancient world, was separated from Italy by the Fretum Siculum, *Straits of Messina*. Its historical names, Sicania and Scilicia, were derived from its original inhabitants, the Sicani and Siculi; the poetical appellations, Trinacria and Triquetra, are supposed to refer to its triangular shape.

The Fretum Siculum is about two miles and a half across at its northern entrance, but gradually expands as it advances southward. The navigation of these straits was supposed to be dangerous in consequence of the proximity of Scylla and Charybdis. The former is a precipitous rock, about 350 feet high, standing out from the mainland of Italy, opposite Prom. Pelorus; the latter is a strong eddy, now called *Galofaro*, caused by the meeting of the currents, and is strongest near Messina: a distance of several miles intervenes between them. Sicily is generally mountainous; three main ridges form the framework of the island—Nebrôdes, *Madonia*, which runs from the centre towards the eastern angle, and there terminates in Prom. Pelôrus, *C. di Faro*; Heræi Montes, *Monti Sori*, which run towards the south-eastern promontory of Pachynus, *C. Passaro*; and Crathas, which traverses the north-western district, and may be considered to terminate in the heights of Eryx, *St. Giuliano*; the name of the western promontory was Lilybæum, *C. Boco*. The most celebrated of the Sicilian mountains, Ætna, is unconcerned with these ranges; it rises out of a plain on the eastern coast in an isolated mass: numerous eruptions are mentioned in classical writers. The plains are few, and of no great extent; the largest is that on which Catania stood, to the south of Ætna, anciently called *Læstrygôn Campus*, and now *Piano di Catania*. The soil of Sicily was, with the exception of the high ground in the centre, eminently fertile; the abundance of grain which it produced rendered it a most important acquisition to the Romans, and obtained for it the appellation of the 'granary of Italy.'

The earliest inhabitants of this island were the Celtic tribe of the Sicani or Siculi—in all probability, the same people under different titles. The Phœnicians established depôts for commercial purposes along the western coasts, and attained considerable power; but their fame and influence were eclipsed by the flourishing colonies planted by the Greeks, along the eastern and southern coasts especially, which became the seats of powerful states, and extended their authority over the whole island. The Romans invaded it in the second Punic war, and reduced it to a province B.C. 241.

Of the numerous towns of Sicily, we can only mention the most illustrious. Messāna, *Messina*, once called Zancle from its *sickle-shaped* harbour, was situated on the Fretum Siculum, opposite Rhegium; it derived its later name from the Messenians, who settled there. Naxos, on the eastern coast, was founded by Chalcidians, B.C. 736, and destroyed by Dionysius B.C. 403; its inhabitants shortly after settled at Tauromenium, *Taormina*. Catāna, *Catania*, was founded by Naxians, B.C. 730; it lay in the rich plain south of Ætna. Not far south was Leontini, *Lentini*, founded by Chalcidians in the same year. Syracūsæ, *Syracusa*, which ranked as the capital, was founded by Dorian colo-

nists under Archias, B.C. 735. The town was originally built on the small island Ortygia, and thence spread to the mainland, with which the island was connected by a mole. The great harbour lay on the southern side of the island, the little harbour on the northern; a stream called the Anāpus discharged itself into the former. The town was situated on gently rising ground, which terminated abruptly towards the plain at the back; the walls enclosed an area twenty-two miles in circumference. It was divided into five districts: Ortygia, on which the citadel stood; Acradina, facing the sea; Tyche, the most densely-populated, behind it; Epipōla, the highest part of the town, overlooking the plain; and Neapolis, near the Anapus. Syracuse was taken by the Romans, B.C. 212. On the southern coast were—Camarina, *Torre Camarina*, a colony from Syracuse, B.C. 598; Gela, *Terra Nova*, founded by Rhodians and Cretans, B.C. 688, on a river of the same name; Agrigentum, or Acragas, *Girgenti*, a colony from Gela, B.C. 580, the most flourishing of the Sicilian towns after Syracuse, its ruins still attesting its former magnificence; Heraclea Minōa, westward of the mouth of the Halycus, successively in the hands of Cretans, Selinuntians, Spartans, and Carthaginians; Selinus, *Castel-vetrano*, founded by Megarians, B.C. 626, in the midst of a very fertile district; and Lilybæum, *Marsala*, a Carthaginian settlement on the promontory of the same name. On the northern coast were—Drepānum, *Trapani*, and Eryx, on the western declivity of the hill so named, both of them Carthaginian towns; Egesta, or Segesta, at the junction of two streams named Scamander and Simois, reputed to be a Trojan colony, and historically famous for its hostility to its neighbour Selinus; Panormus, *Palermo*, celebrated for its spacious harbour; and Himēra, *Termini*, founded by Chalcidians from Messina, B.C. 639, destroyed by the Carthaginians B.C. 409, and replaced by a town on the other side of the river, named Thermæ Himerenses, from hot springs about it. In the interior, the chief towns were—Centuripa, *Centorbi*, an old Siculan town, south-west of Ætna, the most important corn-market in the island; and Enna, *Castro Giovanni*, strongly situated in the central mountains, and hence selected as the strong<sup>1</sup> of the slaves in the second Servile war.

To the north of Sicily lies a group of islands, variously called Æoliæ, Vulcaniæ from their volcanic character, or Liparææ after the largest of them, Lipara, *Lipari*; the most northerly, Strongyia, corresponds with the modern *Stromboli*; Hiēra, *Vulcano*, was the most active in ancient times. Off the western extremity of Sicily are the Ægætes Insulæ, chiefly known from the naval contest in which the Carthaginians were defeated, B.C. 242.

2 SARDINIA, or Sardo, as the Greeks called it, and Corsica, or Cymus, were situated due south of Genua, and parallel, the second to Etruria, the first to Campania. They are both very mountainous: the main ridge in Sardinia was called Insani Montes, in Corsica Aureus Mons. The first was the most productive, but also the most unhealthy; the latter yielded cattle and timber.

The population of Sardinia was originally Iberian, but soon mixed with Carthaginians, who planted colonies along its coasts and obtained a supremacy over the whole island. It fell into the hands of the Romans at the conclusion of the first Punic war, and was united with Corsica as a province. The chief towns were—Olbia, *Terra Nuova*, in the north, the spot of embarkation for Rome; Carālis, *Cagliari*, on the south coast, the seat of government; and Cornus, on the western coast, the capital of the native population.

Corsica was similarly occupied by a variety of races—Iberians, Ligurians, and Carthaginians; the Phocæans also settled here, but soon deserted it. The chief towns were Mariāna, a Roman colony, planted by Marius; and Alēria, probably identical with Alalia where the Phocæans settled, also colonized from Rome: they were both on the eastern coast.

## CHAPTER VIII.

I. HISPANIA. — II. GALLIA. — III. BRITANNICÆ INSULÆ. — IV. GERMANIA.  
V. RHÆTIA, NORICUM, PANNONIA. — VI. DACIA. — VII. SARMATIA EUROPÆA.

I. *Hispania.*

**H**ISPANIA, *Spain and Portugal*, was bounded by the Mare Cantabricum, *Bay of Biscay*, on the N., the Pyrenæi Montes on the N.E., the Mare Internum on the E. and S.E., and the Oceanus Atlanticus on the W. and S.W. The name Hispania is supposed to have been introduced by the Carthaginians: the Greeks named it Iberia, probably because the coast about the river Iberus first became known to them. It was occasionally called Hesperia by the Latin poets, from its westerly position in reference to Italy.

The peninsula of Hispania is severed from the rest of Europe by the Pyrenæi Montes, which commence near the Mediterranean, and run across to the Bay of Biscay. The ramifications of this chain extend over the whole country; the western continuation, which runs parallel to the northern coast, was named Mons Vindius, or Vinnius; Idubēda was the southern offset which forms the western boundary of the valley of the Iberus, with which M. Caunus, *Moncayo*, and Saltus Manlianus, were connected; Orospēda commences about the mid-course of Idubēda, and diverges towards the south, containing the sources of the Bætis; a western offset from it, named M. Marianus, *Sierra Morena*, divides the water-basins of the Anas and the Bætis; a second and parallel ridge, M. Ilipūla, skirts the coast of the Mediterranean, terminating near the *Straits of Gibraltar*.

Among the numerous rivers of Spain six are pre-eminent—the Ibērus, *Ebro*, which drains nearly the whole eastern angle of the peninsula between M. Idubēda and the Pyrenees; the Bætis, *Guadalquivir*, which falls into the Atlantic west of Gades; the Anas, *Guadiana*, which has a parallel course to the north of the Bætis; the Tagus, *Tagus*, which rises in M. Idubēda, and traverses the central provinces in a westerly direction; the Durius, *Douro*, more to the north; and the Minius, or Buēnis, *Minho*, which rises in M. Vindius, and flows towards the S.W. into the Atlantic.

The most remarkable promontories are—Prom. Pyrenæum, *C. de Creux*, on the borders of Gaul; Artemisium, or Ferrara, *C. de St. Martin*, opposite the Insulæ Pityusæ; Scombraria, *C. de Palos*; Prom. Charidēmi, *C. de Gata*, which forms the south-eastern angle; Calpe, *Gibraltar*, one of the celebrated Columnæ Herculis; Prom. Junōnis, *C. Trafalgar*, outside the Fretum Gaditanum, *Straits of Gibraltar*; Prom. Sacrum, *C. St. Vincent*, the south-western angle; Prom. Barbarium, *C. Espichel*; Prom. Magnum, *C. de Roca*, north of the mouth of the Tagus; Prom. Nerium, *C. Finisterre*; and Prom. Trileucum, *C. Ortegal*, at the north-western corner.

Of the various races which tenanted Spain, the Ibēri are generally held to be the aborigines; at an early period, however, a Celtic tribe crossed from Gaul, and coalescing with the Iberians, formed the mixed race of the Celtiberi. In some districts these races remained distinct; the Iberians, the progenitors of the modern *Basques*, occupied the Pyrenees and the sea-coasts; the Celts were found about the Anas and in Gallæcia; while the Celtiberi held the central plains, and particularly the high land where the tributaries of the *Ebro* and *Tagus* take their rise. The Greeks visited the coast and planted some few colonies, of which Barcino, Tarraco, Zacynthus, afterwards Saguntum, and Emporiæ, may be mentioned; they also penetrated outside the *Straits of Gibraltar*, to Gades and Tartessus, the latter of which is

in all probability identical with the Tarshish of Scripture.<sup>c</sup> The Carthaginians, from their greater proximity, traded more regularly with it, and established their stations along the coast. The foundation of Carthago Nova, B.C. 228, led to hostilities with Rome, and for a time the *Ebro* formed the boundary of their respective dominions. At the end of the second Punic war, however, the Carthaginians were expelled, and the Romans divided Spain into two parts, Citerior and Ulterior, the *Ebro* separating them. When the native tribes had been subdued after a series of wars, Augustus divided the country into three provinces—Tarracensis, Bætica, and Lusitania; to which Constantine afterwards added a subdivision of the first, Gallæcia, and three provinces which did not, strictly speaking, belong to Spain—viz., Baleares, Carthaginiensis, and Mauretania Tingitana.

1 LUSITANIA, the most westerly of the divisions of Spain, was bounded on the W. and S., by the Atlantic Ocean, on the N. by the Durius, and on the E. by the Anas and Tarracensis. It comprehended *Portugal* and the Spanish provinces of *Estremadura* and *Salamanca*. The southern angle was called Cuneus, from its resemblance to a *wedge*; a similarity in the name has led some to assign it as the residence of the Cynetes mentioned by Herodotus.

## TRIBES.\*

## TOWNS.

Lusitani, in <i>Portuguese Estremadura</i>	} Scalabis, Santarem.
and <i>Beira</i>	
Vettōnes, in <i>Spanish Estremadura</i>	} Augusta Emerita, Merida.
and <i>Salamanca</i>	
Celtici, in <i>Alentejo</i> and <i>Algarve</i>	Pax Julia, Beia, Ebora, Evora.

2 BÆTICA derived its name from the river Bætis, which flowed through the centre of the province. It was bounded on the N. and W. by the Anas, and on the S. by the Atlantic and the Mediterranean; on the E. it was contiguous to Tarracensis. It corresponds with *Andalusia* and part of *Spanish Estremadura*.

## TRIBES.

## TOWNS.

Turdetani, in <i>Seville</i>	} Hispalis, Seville, Gades, Cadiz.
Turduli, in <i>Cordova</i>	
Bastuli, in <i>Granada</i>	Munda, Monda.
Celtici, in <i>Estremadura</i>	Pax Augusta, Badajoz.

3 TARRACENSIS embraced all the remaining northern, central, and eastern provinces of Spain. It derived its name from its capital town, Tarraco.

## TRIBES.

## TOWNS.

Contestani, in <i>Murcia</i>	} Carthago Nova, Cartagena.
Edetani, in <i>Valencia</i> and <i>Arragon</i>	
Ilercaones, in <i>Eastern Valencia</i> .	} Turium, Valencia, Cæsar Augusta, Saragossa, Saguntum, Murviedro.
Cosetani,	
Læetani,	} Dertosa, Tortosa.
Ausetani,	
Indigetes,	} Tarraco, Tarragona.
Cerretani,	
Lacetani,	} Barcino, Barcelona.
Jacetani,	
Ilergetes,	} Ausa, Vique.
Vesetani,	
	} Emporia, Ampurias.
	} in the district still called Cerdagne.
	} "
	} Ilerda, Lerida.
	} Osca, Huesca.

\* The position of the tribes in Spain is most easily and clearly defined by a reference to the modern divisions of the country, and to the chief towns about which they lived. These are therefore given in a tabular form; the places of particular interest will be noticed presently.

TRIBES.

TOWNS.

Vascōnes,	} in <i>Navarre</i> . . . . .	{ Pompēlon, <i>Pampeluna</i> , Calagurris, <i>Calahorra</i> .
Vardūli,		
Caristi,	} in <i>Biscay</i> .	{ Menosca, <i>St. Sebastian</i> .
Autrigōnes,		
Cantābri, in <i>Santander</i> , and the eastern parts of <i>Asturias</i> .		
Astūres, in <i>Asturias</i> and <i>Leon</i> . . . . .		Asturica, <i>Astorga</i> .
Gallæci, in <i>Gallicia</i> and <i>Northern</i>	} <i>Portugal</i> . . . . .	{ Lucus Augusti, <i>Lugo</i> , Augusta Bra- cāra, <i>Braga</i> .
Vaccæi, in <i>Old Castile</i> . . . . .		
Arevacæ, in <i>Burgos</i> . . . . .		Pallantia, <i>Palentia</i> , Pintia, <i>Valladolid</i> .
Carpetāni, in <i>Madrid</i> and <i>Toledo</i> . . . . .		Clunia, <i>Corunna del Conde</i> .
Oretāni, in <i>Mancha</i> . . . . .		Tolētum, <i>Toledo</i> .
Celtibēri, in <i>Soria</i> and <i>Cuenca</i> . . . . .		Castīlo, <i>Castile</i> .
		Bilbilis, <i>Calatayud</i> .

The places that have obtained any historical celebrity are the following:—Gades, or Gadeira, *Cadiz*, a flourishing port on the southern coast, built on an island adjacent to the main-land,—in later times celebrated for its wealth and luxury; Carteia, *Rocadillo*, near Prom. Calpe, also an important port; Corduba, on the Bætis, the birthplace of the Senecas and Lucan, and besieged by Cæsar in the Civil war; Italica, *Sevilla la Vieja*, on the same river, the birthplace of the emperors Trajan and Hadrian; Illiturgis, *Andujar*, high up the Bætis, taken and destroyed by Scipio, B.C. 210; Munda, *Monda*, near the southern coast, celebrated for the victory of Scipio over the Carthaginians, B.C. 216, and of Cæsar over the sons of Pompey, B.C. 45; Carthago Nova, a sea-port, built by the Carthaginians under Asdrubal, and afterwards taken and colonized by the Romans; Valentia, higher up the coast, destroyed by Pompey in the Sertorian war; Saguntum, on the coast opposite *Majorca*, besieged by the Carthaginians B.C. 219, against whom it held out for eight months; and lastly, Numantia, near the source of the Durius, taken, after a siege of several years, by Scipio Africanus Minor, B.C. 133.

Two groups of islands lie off the eastern coast of Spain—the Baleares, or Gymnesiæ, and the Pityusæ. The former consisted of Major, *Majorca*, Minor, *Minorca*, and some few others of insignificant size; the latter of Ebŭsus, *Ivica*, and Ophiŭsa, *Formentaria*. The Baleares were occupied by a mixed population of Phœnicians, Rhodians, and Spaniards, who were subdued by the Romans B.C. 123. They were chiefly celebrated for their skill in slinging, which adapted them for acting as mercenaries. The name Baleares has been commonly, though improperly, derived from the Greek word βάλλω, 'to cast'—a derivation to which both the spelling of the name, and the fact that the Greeks called them Gymnesiæ, are objections.

## II. Gallia.

GALLIA was bounded on the W. by the Atlantic Ocean, on the S. by the Pyrenees and the Mediterranean Sea, on the E. by the Rhine and the Alps, and on the N. by the Fretum Gallicum, *Straits of Dover*, and the Oceanus Britannicus, *British Channel*. It comprehended *France, Belgium, Switzerland*, with parts of *Holland and Germany*. The Greeks described it by the names Celtica, Galatia, or Celto-Galatia; the Romans named it Gallia Transalpina, or Ulterior, in order to distinguish it from Gallia Cisalpina.

The chief mountain ranges are—the Alps, which have been already described; M. Cebenna, *Cevennes*, a northern continuation of the Pyrenees; M. Jura, *Jura*, north of Lacus Lemanus, *Lake of Geneva*; and M. Vosŭgus, or Vogesus, *Vosges*, which runs parallel to the Rhine, in *Alsace*. A wild and mountainous tract of forest-land, in the N.E., was named Arduenna Silva, *Ardennes*. The chief rivers are—the Rhodānus, *Rhone*, which rises in the Alps, passes through Lacus Lemanus in a westerly course, and after its junction with the Arar, *Saone*, turns towards the south, and flows into the Medi-



terreanean; the Garumna, *Garonne*, which rises in the Pyrenees and flows into the *Bay of Biscay*; the Liger, *Loire*, which has by far the longest course, rising in M. Cebenna, and traversing the central districts of *France*, discharging itself into the *Bay of Biscay*; the Sequana, *Seine*, which flows into the British Channel; the Mosa, *Meuse*, which flows towards the north, and connects with the Rhine near the sea; and lastly, the Rhenus, *Rhine*, which formed the boundary between Gaul and Germany from the Alps to the German Ocean; it formerly discharged itself by two channels, of which the most northerly retained the name of the river, while the other, uniting with the Mosa, was called Vahalis, *Waal*. Mention is made of a third mouth, named Flevum Ostium; this was probably an artificial channel, constructed by Drusus, in order to check the inundations to which the country about the lower course of the river was liable: it connected the Rhine with the *Yssel*, and so with the *Zuyder-Zee*. The chief tributaries of the Rhine in Gaul were the Nava, *Nahe*, and the Mosella, *Moselle*, which rises in M. Vogesus, and joins it at Confluentes, *Coblentz*.

The southern coasts of Gaul were, from an early period, frequented by the Carthaginians; and it is not improbable that an active trade was carried on with Britain and the north, by the *Rhone* and the *Seine*. The Greeks were not much acquainted with it, though Massilia, *Marseilles*, was founded by the Phœceans. The Romans first obtained a footing B.C. 128, by an expedition sent to aid the Massilians against the Salyans; they extended their conquests northwards to the Isara, and, B.C. 121, formed the province of Gallia, afterwards called Narbonensis. The campaigns of Caesar, B.C. 58—50, first opened the interior. He met with three dominant races, the Aquitani, the Celtæ, and the Belgæ, which suggested a threefold division of the conquered districts, Aquitania, Celtica, and Belgica: this was adopted by Augustus, with some variation in the boundaries, and with the substitution of the name Lugdunensis for Celtica. In the later division of the Roman Empire, Gaul was a diocese of the Præfectura Galliarum, and was subdivided into seventeen provinces.

I. AQUITANIA was bounded on the W. by the *Atlantic*, on the S. by the *Pyrenees*, on the E. by M. Cebenna, and on the N. by the Liger. In the later division, it formed three provinces—viz., Novempopulana, *Gascony*; Aquitania Prima, *Auvergne*, *Limosin*, and *Vellai*; and Aquitania Secunda, *Guienne*, *Poitou*, and the intervening districts. The inhabitants of this province consisted of two totally distinct races—the Aquitani, properly so called, who were found only in the south-western angle, in the district afterwards called Novempopulana; and the Celtæ, who occupied the remainder of the province. The former were connected with the Iberi of Spain, and were, in all probability, the aborigines of Gaul.

## TRIBES.

## TOWNS.

Tarbelli,		Lapurdum, <i>Bayonne</i> , Aquæ Augustæ, <i>Dax</i> .
Cocossætæ,	} in <i>Gascony</i> . . . . .	Cocossa, <i>Chalosse</i> .
Convénæ,		Lugdunum, <i>St. Bertrand</i> .
Ausci,		Augusta, <i>Auch</i> .
Vocætæ,		
Tarusætæ,		near <i>Aire</i> .
Elusætæ,	} in <i>Guienne</i> . . . . .	Elusa, <i>Eause</i> .
Bituriges Vivisci,		Burdigala, <i>Bordeaux</i> .
Vasætæ,		Cossio, <i>Bazas</i> .
Petrocorii,		Vesumna, <i>Perigueux</i> .
Nitiobriges,		Aginnum, <i>Agen</i> .
Cadurci,		Divona, <i>Cahors</i> .
Rutēni,		Segodunum, <i>Rodez</i> .
Gabali, in <i>Gevaudan</i> . . . . .		Anderitum, <i>Javols</i> .

TRIBES.

TOWNS.

Vellävi,* in <i>Vellai</i> . . . . .	Ruesium, <i>St. Paullien</i> .
Arverni, in <i>Auvergne</i> . . . . .	Nemossus, <i>Clermont</i> .
Lemovices, in <i>Limosin</i> . . . . .	Augustoritum, <i>Limoges</i> .
Santōnes, in <i>Saintogne</i> . . . . .	Mediolānum, <i>Saintes</i> .
Pictōnes, in <i>Poitou</i> . . . . .	Pictāvi, <i>Poitiers</i> .
Bituriges Cubi, in <i>Berri</i> . . . . .	Avaricum, <i>Bourges</i> .

2 NARBONENSIS was bounded on the W. by M. Cebenna, on the E. by the Alps, on the N. by the Rhodanus, and on the S. by the Mediterranean. Towards the S.W. it extended to the *Pyrenees*, and embraced *Languedoc*. It was subsequently subdivided into five provinces—viz., *Narbonensis Prima, Languedoc; Secunda, Provence; Alpes Maritimæ*, the eastern parts of *Dauphiny* and *Provence; Viennensis, Dauphiny*; and *Alpes Graia et Penina*, the northern and eastern parts of *Savoy*. This portion of Gaul was well known to the Romans, and contains many places of classical interest; among which we may mention *Massilia, Marseilles*, founded B.C. 539, by Phœceans, for a long period the seat of a most extensive commerce, and, when this ceased through the destruction of its fleet by Cæsar, equally famous as a place of fashionable resort; *Arelāte, Arles*, on the Rhone, which ranked as the most beautiful city of Gaul, having been adorned by Constantine and various other Roman emperors; and *Aquæ Sextiæ, Aix*, known as the oldest Roman colony in Gaul, and as a favourite watering-place: near it, Marius gained his victory over the Cimbri.

TRIBES.

TOWNS.

Volcæ Tectosages, } in <i>Languedoc</i> . . . . .	{ Tolōsa, <i>Toulouse</i> .
Volcæ Arecomici, } . . . . .	{ Narbo, <i>Narbonne, Nemausus, Nismes</i> .
Sardōnes, in <i>Roussillon</i> . . . . .	{ Ruscino, near <i>Perpignan</i> .
Salyes, in <i>Provence</i> . . . . .	{ Arelāte, <i>Arles, Aquæ Sextiæ, Aix</i> ,
	{ <i>Massilia, Marseilles</i> .
Cavāri, in <i>Comtat</i> . . . . .	Avenio, <i>Avignon</i> .
Vocontii, in <i>Southern Dauphiny</i> . . . . .	Dea, <i>Dic</i> .
Helvii, in <i>Northern Languedoc</i> . . . . .	Alba, <i>Alps</i> .
Tricastini, } in <i>Dauphiny</i> . . . . .	{ Augusta, <i>Aouste</i> .
Allobroges, } . . . . .	{ Vienna, <i>Vienne, Gratianopolis, Grenoble</i> .

Centrōnes,† about the *little St. Bernard*.

3 LUGDUNENSIS—so called after its metropolis, *Lugdunum*—corresponds with the *Gallia Celtica* of Cæsar. It was bounded on the S. by the Liger, M. Cebenna, and the Rhodanus; on the E. by the Arar, and a line drawn from its source to the *British Channel*, somewhat east of the *Seine*; and on the N. and W. by the Ocean. In the later division it formed four provinces—viz., *Lugdunensis Prima, Burgundy, Lyonnais*, and *Nivornais*; *Secunda, Normandy*; *Tertia, Brittany, Touraine, Maine*, and *Anjou*; and *Quarta*, parts of *Champagne, Isle of France, and Orleans*.

The most famous tribes of this province were the Senones, Lingones, and

\* The reader cannot fail to remark the frequent identity of the modern with the classical names of places in Gaul.

† The course of Hannibal across the Alps was directed through the district of the Centrones, but not, as was formerly supposed, across the pass of the *Little St. Bernard*. Having crossed the Rhone in the neighbourhood of Nemausus, not far from its mouth, he followed up the left bank of the river through the district of the Cavari, as far as the junction of the Isara, *Isère*; thence along the left or southern bank of that river to *Montmélian*, crossing in his route a stream named *Druentia*, (not to be confounded with the *Druentia, Durance*, in the neighbourhood of *Aix*, but probably the *Romanche*, near *Grenoble*;) leaving the *Isère* in the neighbourhood of *Montmélian*, he followed the course of the Arc by *St. Jean de Maurienne*, to the summit of *Mont Cenis*, and thence to Segusio, *Susa*.

Ædui: the two first were among the tribes who crossed the Alps under Brennus; the latter was remarkable for its steady adherence to the Romans. The only town worthy of especial mention is Lugdūnum, *Lyons*, which was advantageously situated at the confluence of the *Rhone* and *Saone*, and hence was elevated to the dignity of a Roman colony, and made the capital of the province. The present capital of France is represented by Lutetia, which was built on the island of *La Cité*.

TRIBES.		TOWNS.
Segusiāni, in <i>Lyonnois</i> . . . . .		Lugdūnum, <i>Lyons</i> .
Ædui,	in <i>Burgundy</i> . . . . .	Augustodūnum, <i>Autun</i> , <i>Matisco</i> , <i>Maçon</i> .
Boii,		Gergovia, perhaps <i>Charlieu</i> .
Mandubii,		Alesia, near <i>Flavigny</i> .
Lingōnes,	in <i>Champagne</i> . . . . .	Andomatūnum, <i>Langres</i> .
Tricassi,		Augustobōna, <i>Troyes</i> .
Meldi,		Latinum, <i>Meaux</i> .
Senōnes,		Agendicum, <i>Sens</i> .
Parisii, in <i>Isle of France</i> . . . . .		Lutetia, <i>Paris</i> .
Veliocasses,	in <i>Normandy</i> * . . . . .	Rotomāgus, <i>Rouen</i> .
Calēti,		Juliobōna, <i>Lillebonne</i> .
Eburovīces,		Mediolānum, <i>Evreux</i> .
Lexovii,		Noviomāgus, <i>Lisieux</i> .
Viducasses,		Argēnus, <i>Vieux</i> .
Baiocasses,		Augustodūrum, <i>Bayeux</i> .
Unelli,		Constantia, <i>Contances</i> .
Abrincatui,		Ingēna, <i>Avranches</i> .
Curiosolites,	in <i>Brittany</i> * . . . . .	Alētum, <i>St. Servan</i> .
Osismii,		Vorginum, <i>Carhaix</i> .
Venēti,		Venetæ, <i>Vannes</i> .
Redōnes,		Condatō, <i>Rennes</i> .
Namnetes,		Condivicium, <i>Nantes</i> .
Diablintes,	in <i>Maine</i> . . . . .	Neodūnum, <i>Jublains</i> .
Arvii,		Vagoritum, <i>Cité Erve</i> .
Cenomāni,		Suindinum, <i>Le Mans</i> .
Andecāvi, in <i>Anjou</i> . . . . .		Juliomāgus, <i>Angers</i> .
Turōnes, in <i>Touraine</i> . . . . .		Cæsarodūnum, <i>Tours</i> .
Carnūtes, in {	<i>Orleanois</i> . . . . .	Genābum, <i>Orleans</i> .
	<i>Chartrain</i> . . . . .	Autricum, <i>Chartres</i> .

Off the coast of Armorica lay the islands Cæsarea, *Jersey*; Sarnia, *Guernsey*; Ridūna, *Alderney*; Uxantis, *Ushant*; and Venetorum Insulæ, *Bellisle*, *Quiberon*, &c.

4 BELGICA was bounded by Lugdunensis on the W., the Alps on the S., the Rhine on the E., and the German Ocean on the N.; it embraced the north-eastern provinces of *France*, and *Belgium*, with parts of *Germany* and *Switzerland*. It was subdivided into five provinces—viz., Belgica Prima, *Lorraine* and *Luxembourg*; Secunda, *Picardy*, *Artois*, and *Flanders*; Germania Prima, the northern part of *Alsace* and the *Rhine Provinces*, down to *Andernach*; G. Secunda, the *Lower Rhine Provinces* and the *Netherlands*; and Maxima Sequanorum, southern *Alsace* and a large part of *Switzerland*.

The inhabitants of this province were partly Celts, partly Germans, partly a mixture of the two. The Sequani and Helvetii belonged to the former race; the Ubii and Batavi, with other tribes on the banks of the Rhine, to the latter; while the mass of the people, the Treviri, Remi, &c., known collectively as the Belgæ, were the descendants of a German race who had

\* These provinces were known by the name Armorica, derived from two Celtic words, signifying a maritime district.

coalesced with the older Celtic population. The Romans were unacquainted with this province until the time of Cæsar's expeditions, which spread over a term of eight years, B.C. 58—50, and which ended in the successive defeat of the Helvetii, Belgæ, and Aquitani. Roman colonies were planted in different localities, in order to retain the submission of the conquered people. Generally the chief towns of the native tribes were selected for this purpose, which, with a Roman name, were also romanized in appearance and character, and were not unworthy progenitors of the towns which now stand on their sites. The most important colonies, however, were those which were established at a later period, to check the incursions of the Germanic tribes. The wars of Drusus, B.C. 12—9, and of Germanicus, A.D. 14—16, led to the erection of no less than fifty forts along the banks of the Rhine. Some of these became most important towns: Argentoratum, *Strasbourg*, was both a garrison town and an arsenal, where arms were manufactured and stored for the use of the troops in the northern wars; Mogontiacum, *Mayence*, was fortified by Drusus, and became afterwards the capital of Germania Prima; Augusta Trevirorum, *Trèves*, was also a fortified Roman colony, and from its advantageous position the usual residence of the Roman generals: it became the capital of Belgica Prima; Bonna, *Bonn*, was an important post, as Drusus had thrown a bridge across the Rhine at this point; Antonacum, *Andernach*, Gesonia, *Zons*, Novesium, *Neuss*, were also military fortresses, though of less importance. But the most flourishing of all the colonies was that which Claudius established, A.D. 51, at the previously existing town of the Ubii (Oppidum, or Ara Ubiorum), and which he named, in honour of his wife, Colonia Agrippina, *Cologne*, afterwards the capital of Germania Secunda. The Ubii were a German tribe, who had been transplanted to the left bank of the river by Agrippa, B.C. 37. Lower down the river, Castra Vetera was an intrenched camp, on the site of the modern *Xanten*; in the district of the Batavi, called Insula Batavorum, which lay between the *Rhine*, *Waal*, *Meuse*, and the sea, there were a number of insulated forts, the position of which is uncertain. At the mouth of the Rhine, Caligula erected a lighthouse, the remains of which yet exist under the name of *Calla-Thurm*.

TRIBES.

TOWNS.

Helvetii, in <i>Switzerland</i> . . . . .	Aventicum, <i>Avenche</i> .
Raurici, } in <i>Alsace</i> . . . . .	{ Augusta, <i>Augst</i> .
Tribocci, } . . . . .	{ Argentoratum, <i>Strasbourg</i> .
Sequani, in <i>Franche Comté</i> . . . . .	Visontio, <i>Besançon</i> .
Leuci, } in <i>Lorraine</i> . . . . .	{ Tullum, <i>Toul</i> .
Mediomatrici, } . . . . .	{ Divodurum, <i>Metz</i> .
Nemetes, . . . . .	Noviomagus, <i>Spire</i> .
Vangiones, with the } on the <i>Rhine</i> . . . . .	{ Borbetomagus, <i>Worms</i> .
Caracates. } . . . . .	{ Mogontiacum, <i>Mayence</i> .
Treviri, { in <i>Luxembourg</i> and along } . . . . .	{ Augusta, <i>Trèves</i> .
{ the <i>Moselle</i> . . . . .	{ Confluentes, <i>Coblentz</i> .
Ubii, on the <i>Rhine</i> . . . . .	{ Antonacum, <i>Andernach</i> , Colonia
	{ Agrippina, <i>Cologne</i> .
Cæresii, } . . . . .	
Pæmāni, } in the <i>Ardennes</i> and <i>Eifelgebirge</i> .	
Segni, } . . . . .	
Condrusii, } . . . . .	
Tungri, in <i>Liège</i> . . . . .	Aduatrica, <i>Tongres</i> .
Eburones, } in <i>South Brabant</i> .	
Aduatlici, } . . . . .	
Gugerni, on the <i>Rhine</i> . . . . .	Vetera Castra, <i>Xanten</i> .
Batavi, in <i>Utrecht</i> and <i>Zealand</i> . . . . .	Lugdunum, <i>Leyden</i> .
Menapii, in <i>Anvers</i> & <i>North Brabant</i> . . . . .	Castellum Menapiorum, <i>Kessel</i> .
Toxandri, in <i>Limbourg</i> .	
Nervii, in <i>Hainault</i> and <i>Namur</i> . . . . .	Baganum, <i>Bavai</i> .

## \* TRIBES.

## TOWNS.

Morini, in <i>Flanders</i> . . . . .	{ Gesoriacum, <i>Boulogne</i> .
Ambiani, in <i>Picardy</i> . . . . .	{ Portus Itius,* <i>Sangatte</i> .
Bellovaci, } in <i>Isle of France</i> . . . .	{ Samarobriua, <i>Amiens</i> .
Suessiones, }	{ Caesaromagus, <i>Beauvais</i> .
Veromandui, in <i>Vermandois</i> . . . .	{ Augusta,† <i>Soissons</i> .
Atrebatēs, in <i>Artois</i> . . . . .	{ Augusta, <i>St. Quentin</i> .
Remi, in <i>Northern Champagne</i> . . .	{ Nemetacum, <i>Arras</i> .
	{ Durocortorum, <i>Reims</i> .

\* III. *Britannicæ Insulæ*.

The name *Britannia* was applied in ancient geography, as *Great Britain* is in modern, to *England* and *Scotland* exclusively; *Ireland*, however, was included in the term *Britannicæ Insulæ*. The name *Albion* was used synonymously with *Britannia*. The Carthaginians were the earliest nation that became acquainted with these islands; but the description they gave of them, as related by the Greek geographers, was very vague. The name *Cassiterides* is generally supposed to apply to the *Scilly Isles*, but there are strong reasons for understanding by it *Cornwall* and *Devonshire*. Little or nothing was known of the interior of the country until *Cæsar's* invasions in the years 55 and 54 B.C.; he penetrated northward of the *Thames*, without making any permanent conquests. It was not until nearly a century after this that the Romans undertook the subjugation of Britain. *Claudius*, A.D. 43, sent *Aulus Plautius* with forces for this purpose, who succeeded in subduing the southern and eastern tribes. *Ostorius*, his successor, carried his arms into *Wales* and *Shropshire*. *Mona, Anglesea*, was subdued by *Paulinus Suetonius*. *Petilius Cerealis*, in the reign of *Vespasian*, completed the conquest of the *Brigantes* in *Yorkshire*, and *Julius Frontinus* that of the *Silures* in *South Wales*. Finally, *Agricola* (A.D. 78—84) advanced the Roman boundary to the *Firths of Forth* and *Clyde*, and established a line of forts between these two. From this, however, the Romans were soon obliged to withdraw; and *Hadrian*, in A.D. 121, constructed a new line of defence, *Hadriani Vallum*, *Picts' Wall*, between *Solway Firth* and the *Tyne*. In the reign of *Antoninus Pius*, the boundary was again pushed forward to its former position, and a regular rampart, *Vallum Antonini*, *Graham's Dyke*, was established from sea to sea. The *Caledonians* again forced a withdrawal, and the limit of the Roman dominion was finally fixed at the *Solway Firth* and *Tyne*, between which *Severus*, A.D. 209, built a wall parallel to that of *Hadrian*.

Until the reign of *Severus*, *Britannia* had been governed as a single province by a *Prætor*; he divided it into two, *Superior* and *Inferior*, separated by the *Thames* and the *Bristol Channel*. By *Constantine* it was subdivided into four—viz., *Britannia Prima*, south of the *Thames*; *Secunda, Wales*; *Flavia Cæsariensis*, between the *Thames*, *Severn*, and *Humber*; and *Maxima Cæsariensis*, between the *Humber* and the *Tyne*. The district between the walls of *Hadrian* and *Antonine* was named *Valentia*; the country still more north, *Vespasiana*; and the northern part of *Scotland*, *Caledonia*, or *Britannia Barbara*.

The prominent features of the coasts—the promontories, rivers, and estuaries—are described by the ancients; but the mountain ranges are not noticed. On the eastern coast, the most important promontories are—*Cantium Prom.*, *North Foreland*; *Ocellum Prom.*, *Spurn-head*; *Tæzalum*

\* It was from this spot that *Cæsar* crossed over to Britain. In his history he distinguishes three ports in this neighbourhood: *P. Itius* or *Itius*, *P. Superior*, and *P. Inferior*; the two latter are probably identical with *Gravelines* and *Wissant*.

† The numerous towns named *Augusta* by the Romans, were distinguished by the addition of the name of the tribe in whose territory they stood; as *Augusta Trevirorum*, *Trèves*, *A. Suessionum*, *Soissons*, &c.

Prom., *Kinnaird's Head*; and Verubium Prom., *Duncansby Head*, the north-east point of Scotland; the rivers and estuaries—the *Tamēsis*, *Thames*; *Metāris* *Æstuarium*, *The Wash*; *Abus*, *Humber*; *Boderia* or *Bodotria* *Æst.*, *Firth of Forth*; *Tava*, *Tay*; *Deva*, *Dce*; *Tuēsis* *Æst.*, *Murray Firth*; and *Varar*, *Dornoch Firth*. On the southern coast, the promontories are—*Damnonium* or *Ocrinum*, *Lizard Point*, and *Antivestacum*, or *Bolerium*, *Land's End*; and the rivers—*Trisanton*, *Arun*; *Alaunus*, *Avon*; and *Tamārus*, *Tamar*. On the western coast, the promontories are—*Herculis Prom.*, *Hartland Point*; *Octopitarum Prom.*, *St. David's Head*; *Cangnorum Prom.*, *Braich-y-pwll*; *Novantum Prom.*, *Mull of Galloway*; *Epidium Prom.*, *Mull of Cantire*; and *Tarvōdum* or *Orcas Prom.*, *C. Wrath*; the rivers and estuaries—*Sabrina*, *Severn*, flowing into *Sabriana* *Æst.*, *Bristol Channel*; *Seteia* *Æst.*, the mouth of the *Dee*; *Belisāma* *Æst.*, the mouth of the *Mersey*; *Moricambe* *Æst.*, *Morecambe Bay*; *Itūna* *Æst.*, *Solway Firth*; and *Clota* *Æst.*, *Firth of Clyde*.

The disposition of the native tribes at the time when the Romans became acquainted with them, was as follows:

In *BRITANNIA PRIMA*:—*Cantii*, in *Kent*; the *Regni*, in *Surrey* and *Sussex*; the *Belgæ*, in *Hampshire*, *Wiltshire*, and *Somersetshire*; the *Atrebatii*, in *Berkshire*; the *Durotriges*, in *Dorsetshire*; and the *Damnonii*, in *Devonshire* and *Cornwall*.

In *BRITANNIA SECUNDA*:—the *Demētæ*, in *Pembrokeshire* and *Cardigan-shire*; the *Silūres*, in the remainder of *South Wales* and *Monmouthshire*; the *Ordovices*, in *North Wales* and *Shropshire*; and the *Cangi*, in *Carnarvon-shire*.

In *FLAVIA CÆSARIENSIS*:—the *Trinobantes*, in *Essex* and *Middlesex*; the *Cenimagni*, in *Suffolk*; the *Icēni*, in *Norfolk*; the *Catuvellauni*, in the counties of *Hertford*, *Northampton*, *Buckingham*, *Cambridge*, and *Bedford*; the *Dobūni*, in *Gloucestershire* and *Oxfordshire*; the *Cornavii*, in *Warwickshire* and *Staffordshire*; and the *Coritāni*, in *Lincolnshire* and *Leicestershire*.

In *MAXIMA CÆSARIENSIS*:—the *Brigantes*, and an insignificant tribe, the *Parisi*, near Prom. *Ocellum*.

In *VALENTIA*:—the *Elgōvæ*, in *Dumfriesshire* and *Kirkcudbrightshire*; the *Novantæ*, in *Wigtownshire*; the *Otodēni*, along the eastern coast; and the *Damni*, south of Antonine's wall.

In *ROMANA BARBARA*:—the *Caledonii*, subdivided into various unimportant tribes.

The details of the ancient geography of our native island are for the most part interesting only from local associations. Few historical events are mentioned in connexion with special localities; more, indeed, can be learnt from the materials which are supplied by excavations of the old Roman sites, than from any literary records. The positions of the various tribes have been already noticed; it remains now to state some few particulars with respect to the most important towns. *Rutūpiæ*, *Richborough*, in *Kent*, was the usual port of transit to Gaul. *Dubræ*, *Dover*, *Lemanus Portus*, *Lymne*, and *Reculbium*, *Reculver*, were also frequented. *Iondinium*, *London*, was a considerable town when Cæsar visited Britain. Ptolemy places it on the right bank of the Thames; but the main town was on the site of 'the City.' It was destroyed in Boadicea's war, but restored and surrounded by fortifications by Constantine; though only in the rank of a colonia, it became the capital of the country, with the name *Augusta Trinobantum*. The southern counties, together with *Gloucestershire* and *Oxfordshire*, seem to have been the favourite district of the wealthy Romans. *Aquæ Solis*, *Bath*, was frequented for its waters. *Corinium*, *Cirencester*, *Venta Belgarum*, *Winchester*, *Moridūm*, *Dorchester*, were considerable towns, and adorned with various public buildings. *Iscæ Silurum*, *Cæcleon*, was one of the three great military stations of Britain; it was selected for the purpose of restraining the attacks of the Welsh tribes. The other two posts were *Deva*, *Chester*, and *Eboracūm*, *York*: the former checked the inroads of the Irish, the latter served as the

head-quarters for all expeditions against the Caledonians; its importance in this respect raised it to the dignity of a Roman municipium, and made it the frequent residence of the emperors, two of whom, Severus and Constantius Chlorus, died there. The wall of Hadrian was defended by a series of military stations, to the number of twenty-three, which became regular towns; and between these were intermediate forts. The wall of Antoninus was similarly defended by eighteen forts, which, however, were not tenanted sufficiently long to become towns. North of this wall, the name *Alata Castra* indicates the existence of an entrenched camp, supposed to have been near *Inverness*. In the eastern counties we meet with the important towns of *Lindum, Lincoln*, a colony and station on the road between *London* and *York*; *Venta Icenorum*, near *Norwich*; *Durobrivæ, Castor*, in *Northamptonshire*, where a considerable manufacture of pottery was carried on; *Verulamium, St. Albans*, the old capital of *Cassivellaunus*, and a Roman municipium; and *Camalodunum, Colchester*, the first Roman colony, having been selected for that purpose by the emperor *Claudius*. There were in all thirty-three privileged Roman towns in Britain, of which two, *Eboracum* and *Verulamium*, possessed the full rights of citizenship; nine ranked as *Coloniæ*, and the remainder as *Stipendiariæ*, with various but uncertain privileges.

*HIBERNIA, Ireland*, was not visited by the Romans; their acquaintance with it was limited to the accounts gleaned from the natives in their commercial visits to Britain. The names by which it was described, *Hibernia, Ierne, Juverna*, have the same common root as the modern names *Erin* and *Ireland* with the addition of a prefix *Hi* or *I*, indicating a *people*. There was also a tribe of the same name—or more probably a number of tribes sharing the collective name—the *Ivernii*, who occupied *Munster*, with a town, likewise called *Ivernus*, on the *Shannon*. Various other tribes are mentioned by *Ptolemy*, whose names are so far important as they aid the ethnologist in establishing an affinity between the ancient inhabitants of Ireland and other Celtic races; thus we hear of a tribe—the *Menapii*, in *Wexford*—cognominous with a Belgic tribe in the *Netherlands*: again of the *Brigantes*, in the same neighbourhood, a branch of the same race we have already met with in *Yorkshire*: and again of a town, *Dunum*, which appears so frequently in the terminations of Celtic names, as *Lugdunum, &c.* An early connexion probably existed between Spain and Ireland.

The *Isle of Man* received the names *Monarina*, and *Monapia*, evidently containing the same root as the name *Mona, Anglesea*. The *Hebrides* were called *Ebūdæ*; the *Orkneys*, *Orcādes*; the *Scilly Isles*, *Cassiterides, Silurum*, or *Sylina Insulæ*; and the *Isle of Wight*, *Vectis*. *Diodorus* relates that the *Massilians* traded on the latter island with the native Britons for tin, which was brought in wagons from the main-land across the channel (the *Solent*), when it was dry at the ebb of the tide. We have, lastly, to mention the island of *Thule*, which was discovered by *Pytheas* of *Marseilles*, and which, according to his account, would correspond with *Iceland*: subsequent descriptions of its position vary exceedingly. *Ptolemy's Thule* would correspond rather with the largest of the *Shetlands*; in fact, *Thule* became a proverbial expression for the most northerly point of the known world.

#### IV. *Germania.*

*GERMANIA* was bounded by the Rhine on the W., the Danube on the S., the Vistula on the E., and the *Mare Germanicum* and *Mare Suevicum, Baltic Sea*, on the N. It was occasionally called *Magna*, or *Barbara*, in distinction to the Roman provinces, *Germania Prima* and *Secunda*, on the left bank of the Rhine; it embraced *Germany*, with the exception of the countries south of the Danube, together with what little was known of *Denmark, Sweden*, and *Norway*.

The mountains of *Germany* were in ancient times clothed with forests, and are hence described by the Romans under the name *Silvæ*. The largest of these, *Hercynia Silva*, included all the great ranges, commencing near the borders

of the Helvetii in the S., and extending parallel to the Danube as far as Dacia eastward, and along the Rhine northward. The name yet survives in the modern *Hartz* in *Hanover*. In addition to this general title, the chief ranges received specific names, of which we may mention Mons *Abnōba*, the *Black Forest*; *Baccenis Silva*, *Thüringer-wald*; *Melibœus Mons*, *Hartz*; *Sudēti Montes*, *Erz-gebirge*, and *Vandalici Montes*, *Rieser-gebirge*, which inclose *Bohemia* on the north; and *Gabrēta Silva*, *Böhmer-wald*, which forms the southern boundary of that country; *Asciburgicus Mons*, the *Western Carpathians*, and *Sarmatici Montes*, the *Eastern Carpathians*, to the north of *Hungary*; *Taunus Mons*, *Taunus*, on the right bank of the Rhine, in *Nassau*; and *Silva Teutoburgiensis*, *Teutoberger Wald*, between the rivers *Ems* and *Weser*, near *Osnabrück*.

Of the rivers of Germany, the *Danubius* or *Ister*, *Danube*, is the largest; its course has been already noticed. The *Rhenus*, which comes next, and which also has been noticed, receives several important tributaries on its right bank, such as the *Nicer*, *Neckar*, the *Mœnus*, *Maine*, and the *Lupia*, *Lippe*. The *Amisia*, *Ems*, the *Visurgis*, *Weser*, and the *Albis*, *Elbe*, flow into the *Mare Germanicum*; the *Vistula*, *Vistula*, into the *Mare Suevicum*.

The Romans were little acquainted with the interior of Germany. *Cæsar* crossed the Rhine twice, but did not advance far from its banks. *Drusus* (B.C. 12) advanced as far as the *Weser*, and subdued the tribes in and about *Westphalia*. The revolt under *Arminius*, and the defeat of *Varus*, in the *Teutoburger Wald*, led to the war in the same quarter which was conducted by *Germanicus*, A.D. 14—16. The Romans did not, however, succeed in establishing a permanent supremacy in the north of Germany: they were obliged to confine themselves to a district between the upper courses of the Danube and the Rhine, named *Agri Decumates*, which they inclosed in a wall between the two rivers, commencing near *Coblentz*, and terminating near *Ratisbon*. This wall remained the limit of the Roman empire until the *Marcomannic wars*, A.D. 167—180, when it was withdrawn to the Danube.

The positions of the German tribes are with difficulty ascertained, partly from the indefiniteness of the statements concerning them, partly from the constant migrations that took place. *Tacitus* mentions three great families, the *Ingvæones* along the northern coast, the *Hermiones* in the centre, and the *Istavones* in the eastern and southern regions. *Pliny* adds to these the *Vindili*, and the *Peucini* with the *Bastarnæ*, thus making a five-fold division. The inhabitants of *Scandia*, *Denmark*, are named by the latter *Hilleviōnes*, by the former, *Suiōnes* and *Sitōnes*. It is difficult to reconcile these divisions of *Tacitus* and *Pliny*, or to classify the various tribes in their proper families. In all probability, the division of *Tacitus* applies only to the tribes westward of the *Elbe*, and not to the whole of Germany; the *Ingvæones* occupying the coast from the *Rhine* to the *Elbe*; the *Istavones* the banks of the *Rhine*, from *Mons Taunus* to the *Isala*, *Yssel*, and inland to *Teutoburgiensis Silva*; and the *Hermiones*, the districts to the eastward which belonged to the tribes of the *Cherusci* and *Chatti*. According to another view, the *Hermiones* included the *Vindili*, who lived along the shores of the Baltic, the *Peucini* and *Bastarnæ*, and all the tribes of central and southern Germany.

In this uncertainty it appears best to omit any attempt at classification, and merely to mark the locality of each tribe separately. The *Frisii* lived along the coast from *Flevo Lacus*, *Zuyder-zee*, to the *Ems*, in *Friesland* and *Gröningen*; the *Chauci* between the *Ems* and the *Elbe*, in *Oldenburg* and *Hanover*, the *Visurgis*, *Weser*, dividing them into two clans, *Mayores* on the east, and *Minores* on the west; eastward of the *Elbe*, the *Saxōnes* (first mentioned by *Ptolemy*) in *Holstein*, a sea-faring tribe; the *Angli* in *Schleswig*; north of them the *Cimbri*, in *Denmark*, named after them *Cimbrica Chersonesus*. Along the coast of the *Baltic Sea*, the *Vindili*, subdivided into numerous tribes, of which the *Burgundiones*, in *Posen*, was the most important.

Returning westward, we meet with the following tribes between the *Rhine* and *Elbe*—the *Usipètes*, on the banks of the former, between the *Lippe* and the



*Yssel*; the Bructëri, in *Westphalia*, divided into *Majores* and *Minores*; the Sicambri, to the south of the Brueteri; the Teuctëri, along the Rhine, opposite *Cologne*; the Chatti, a very powerful tribe, in *Hesse Cassel*; the Cherusei, who took the lead in the revolt under Arminius, in *Saxony*; the Angrivarii, about the middle course of the *Weser*; the Langobardi, the ancestors of the Lombards, along the *Elbe*, in *Luneburg* and *Altmark*; and the Mattiäci, in *Nassau*, probably a subdivision of the Chatti.

The Agri Decumates, supposed to be so called because the inhabitants were obliged to give the Romans a tenth of their produce, were occupied by several unimportant tribes, who were afterwards incorporated in the confederacy of the Alemanni.

The tribes of *Central and Eastern Germany* were chiefly subdivisions of the Suevic race; the most important were—the Hermundüri, in *Bavaria* and part of *Saxony*; the Marcomanni, in *Bohemia*, the former residence of the Boii, after whom it was called Boiohemum; the Quadi, in *Moravia* and part of *Hungary*; the Sennönes, on the *Elbe*, in *Brandenburg*; the Rugii, in *Pomerania*; the Gothönes, about the mouth of the Vistula; and the Lygii, in *Poland* and *Posen*.

The Romans reckoned the Scandinavian peninsula as part of Germania, but their notions of it were very indistinct. Mention is made of the Scandiae Insulae, four in number, one of which, from its superior size, was named Scandia; the latter may very possibly represent *Sweden*, and the other islands the *Danish* group. Pliny speaks of another large island named Nerigos, which, from the similarity of name, is identified with *Norway*. The *Great* and *Little Belts* are called in ancient geography, Sinus Lagnus, and the *Kattegat* Sinus Codanus.

#### V. *Vindelicia, Rætia, Noricum, and Pannonia.*

The districts south of the Danube, which are now included in the Germanic empire, were reckoned by ancient writers as belonging to Illyria rather than to Germania. They were conquered by the Romans B.C. 15, and henceforward formed separate countries, having been divided by Augustus into four provinces.

1 VINDELICIA was bounded on the N. by the *Danube*, on the W. by the territory of the Helvetii, on the south by the Rætian Alps, and on the E. by the *Œnus*, *Inn*. It was incorporated with Rætia about 100 A.D., with the title Rætia Secunda; it corresponds with parts of *Bavaria* and the adjacent states. The northern district is tolerably level, the southern mountainous: it is watered by the *Lacus*, *Lech*, *Isarus*, *Isar*, and *Œnus*, all of them tributaries to the *Danube*. The *Lacus Venetus*, *L. of Constance*, fell within its limits.

The tribes of Vindelicia were—the Brigantii, with the town Brigantium, *Bregentz*, at the eastern extremity of the *L. Venetus*; the Licates, about the *Lech*, with the capital Augusta Vindelicorum, *Augsburg*, made a Roman colony B.C. 14; and the Runicates, with the town Reginum, *Ratisbon*, on the *Danube*.

2 RHÆTIA lay S. of Vindelicia, in the *Grisons* and *Tyrol*. The highest chain of the Alps separated it from Italy, and it was watered by the upper courses of the *Athesis* and the *Œnus*; the chains of the Rætian Alps intersect it in all directions.

The inhabitants of Rætia were of Celtic extraction; the chief tribes were—the Lepontii, on the southern declivities of the Alps, in *Tessino*; the Brixentes, about *Brixen*; the Tridentini, with the capital town Tridentum, *Trent*, on the *Athesis*; and the Breuni, in the north. It has been supposed that some Tuscan tribes took refuge in the valleys of the *Grisons* at the time of the Gallic invasion under Brennus, and that traces of their language yet survive in some places.

3 NORICUM was bounded on the N. by the *Danube*; on the E. by *M. Cetus*, *Kahlenberg*, and *Pannonia*; on the S. by the *Alpes Carniæ*; and on the W. by Rætia and Vindelicia; it corresponds with *Styria* and parts of *Austria*. It is highly mountainous, the various ranges which traverse it

receiving the general name of *Alpes Noricæ*: the southern districts are watered by the upper courses of the *Savus*, *Save*, and *Dravus*, *Drave*. The chief tribes at the time of the Roman conquest were—the *Taurisci*, who appear to have been the original inhabitants, and who occupied the south-eastern portion of the province; and the *Boii*, an immigrant tribe, who settled along the banks of the *Danube*. The towns were—*Noreia*, *Neumarkt*, the ancient capital of the *Taurisci*, from which the province derived its name; *Virünnum*, near *Klagenfurt*, in the valley of the *Dravus*; *Juvavia*, *Salzburg*, on a tributary of the *Enus*, colonized by *Hadrian*; and various border towns erected by the Romans along the course of the *Danube*, such as *Laureacum*, *Lorch*, *Boiodurum*, *Innsbruck*, *Lentia*, *Lintz*, &c.

4 *PANNONIA* was bounded on the N. and E. by the *Danube*; on the S. by the valley of the *Savus*; and on the W. by *Noricum* and *Venetia*; it thus comprised western *Hungary*, *Sclavonia*, and parts of *Styria* and *Croatia*. The Romans originally divided it into two provinces, Superior the western, and Inferior the eastern half. In the fourth century *Galerius* formed the eastern part of the latter into a separate province, called *Valeria*; and *Constantine the Great* equalized the two old divisions, by adding the southern part of Superior to Inferior. *Pannonia* is watered by the lower courses of the *Savus* and *Dravus*, and by the *Arrabo*, *Raab*, flowing northwards to the *Danube*; a large lake, *Pelso*, *Platten-see*, lies in the centre of the province.

The towns of *Pannonia* rose into importance in the wars which the Romans had to sustain against the northern hordes; the most important were—*Vindobona*, *Vienna*, a Roman municipium on the *Danube*; *Carnuntum*, lower down that river, an important post in the *Marcomannic* war; *Aquincum*, *Buda*, where the Romans had a manufactory of arms; *Taurunum*, *Scmlin*, at the junction of the *Savus*; *Cibalis*, the birthplace of *Valentinian*, and the scene of *Constantine's* victory over *Licinianus*, between the *Savus* and *Dravus*; *Mursa*, *Essek*, on the right bank of the latter, the residence of the Roman governors; *Siscia*, *Sissek*, a strong post in the upper valley of the *Savus*, the head-quarters of the Romans in the *Illyrian* and *Pannonian* campaigns; *Petovium*, *Pettau*, on the *Dravus*, with a palace of the Roman emperors; and *Subaria*, westward of the *Arrabo*, where *Ovid* was buried.

## VI. *Dacia*.

The Roman province of *Dacia* was bounded on the N. by *M. Carpatæ*; on the S. by the *Danube*; on the E. by the *Tyras*, *Dniester*, and the *Euxine*; and on the W. by the *Tibiscus*, *Theiss*; it thus comprised part of *Hungary*, *Moldavia*, and *Bessarabia*. The name *Dacia* does not appear before the commencement of the Christian era; the *Daci* were, however, doubtless the same people as the *Getae*, whom we find in the time of *Herodotus* living south of the *Danube*, and who were pressed northwards by the *Macedonians*. The *Daci* became formidable opponents to the Roman power in the first century after Christ; *Trajan* subdued them after a contest of five years, A.D. 100—105, and reduced their country to the condition of a Roman province.

The chief mountain range is *M. Carpatæ*, *Carpathians*, which descends from the northern frontier towards the *Danube*, and occupies the centre of the province with its numerous ramifications. The chief rivers were the *Ister*, and the *Pathissus*, or *Tibiscus*, *Theiss*, which formed the western boundary; the other large tributaries of the *Danube* have been already noticed in *Herodotus's* account of that river. *Trajan* threw a bridge across the *Danube*, probably at *Trhernetz*, below *Orsora*. The chief town of *Dacia* was *Tibiscum*, *Temesvar*, in the western part of the province.

The district westward of *Dacia*, between the *Theiss* and the *Danube*, was occupied by a Sarmatian tribe, the *Iazyges*, surnamed *Metanastæ*, from their having been transplanted thither from their original quarters about the *Palus Mæotis*: they settled here in the first century of the Christian era, and remained until they were driven out by the *Goths*. The ancients had very little acquaintance with this district.

VII. *Sarmatia Europæa.*

The vast regions of northern and eastern Europe are described by Herodotus and the earlier geographers under the name Scythia, and by later writers, commencing with Mela, under the name Sarmatia.

The mountain ranges are—Montes Rhipæi or Hyperborei, under which the *Ural* range is included; M. Carpatæ, and M. Sarmaticus, the *Carpathian* ranges, on the southern border; M. Peuce, in *Gallicia*; and the Venedici Montes, eastward of the *Vistula*. The most important rivers are—the Tanais, *Don*, which is described as rising in the Rhipæi Montes, and after a long course, first towards the S. E., and finally towards the S. W., discharging itself into the Palus Mæotis; the Borysthènes, *Dnieper*, which takes a parallel course to the Tanais, and joins the Euxine westward of it; it was navigated for a distance of four days' sail; the Hypänis, *Bog*, a less important stream to the westward; and the Tyras, *Dniester*, which rises on the northern declivities of M. Carpatæ, and also flows into the Euxine.

The principal tribes of this vast district, as described by Ptolemy, were—the Venædæ, on the shores of the *Baltic Sea*, from the *Vistula* to the *Gulf of Finland*; the Peucini and Bastarnæ, along the upper course of the *Vistula*, and among the northern ridges of the Carpathians; the Alauni, in *Central Russia*; the Sarmatæ or Sauromatæ, on the shores of the Euxine, between the *Dniester* and *Dnieper*; the Iazyges and Roxolani, between the *Dnieper* and *Don*; the Tauri, in Chersonesus Taurica, *Crimea*; the Tauroseythæ, outside the neck of the peninsula, and on the tongue of land called Dromos Achilleos, *Cosa Tendra*; and the Hamaxobii, about the middle course of the *Dnieper*.

The only towns deserving of notice were the Greek settlements on the shores of the Euxine—viz., Chersonesus, a Megarian colony in the south of the Tauric peninsula; Theodosia, *Kefa*, a Milesian colony on the eastern coast; Panticapæum, *Kertch*, at the neck of the Bosphorus Cimmerius—the strait which connects the Palus Mæotis, *Sea of Azov*, with the Euxine; Carcina, at the neck of the Chersonese; Olbia, at the mouth of the Hypanis; Tyras, at the mouth of the Tyras; and Tanais, named after the river on which it stood.

## CHAPTER IX.

I. AFRICA.—II. ÆGYPTUS.—III. ÆTHIOPIA.—IV. MARMARICA.

V. CYRENAICA.—VI. SYRTICA.—VII. AFRICA PROPRIA.—VIII. NUMIDIA.

IX. MAURETANIA.—X. LIBYA INTERIOR.—XI. THE ROMAN EMPIRE.

I. *Africa.*

THE continent which we, after the Romans, call Africa, was known to the Greeks by the name Libya. The etymology of these names is doubtful; but it appears certain that they were originally applied to *districts*, and thence extended to the *continent*. Libya designated that part of the upper coast of Africa which lay between the greater Syrtis and Egypt; and it has been conjectured that at the time when the Greeks first became acquainted with this region, a wandering tribe, named *Lebæta*, now living in the interior, were settled on the sea-coast, and that from them the name Libya had its origin. As this part of the coast was the first which the Greeks visited, it is not surprising that they should have adopted the name for the whole continent. Africa, again, was originally applied to a district in the neighbourhood of Carthage. This was the point with which the Romans first came in contact; they named their first province from it, and by degrees extended the name over the whole continent.

Africa was frequently treated as a portion of Asia, and occasionally as part of Europe; but the general opinion of antiquity granted it the dignity of being a separate continent. In this sense, it was bounded on the N. by the Mare Internum, or, as the Greeks would have described it, the Mare Libycum; on the W. by the Mare Atlanticum; on the E. by the Sinus Arabicus; and on the S. by the Oceanus Æthiopicus. With the exception of the north coast, little was known of the geography of Africa; the eastern and western coasts had been explored—the former, to ten degrees south of the equator, the latter to about five degrees north; but the portion with which the ancients were really acquainted may be described as a triangle, formed by the Red Sea, the Mediterranean, and an imaginary line drawn from the Straits of Gibraltar to those of *Babel-mandeb*.

Herodotus divided this continent into three provinces—Ægypt, Æthiopia, and Libya: Ægypt to the east, bordering on Asia; Libya, the remaining coast-land westward; and Æthiopia, the interior. The political division of the continent most suitable for a manual of Ancient Geography is that which the Roman writers have adopted—viz., Ægypt, Æthiopia, Marmarica, Cyrenaica, Syrtica, Numidia, and Mauretania.

## II. *Ægyptus*.

ÆGYPTUS is the classical name for the country which the Hebrews called Mizraim, and the Arabs still call Mesr. It consists of a narrow valley, about 500 miles long, bounded by the Red Sea and the Isthmus of Arsinoe, *Suez*, on the E.; by a low chain of hills, separating it from the Desert, on the W.; by the Mediterranean, on the N.; and on the S. by a line drawn just below Elephantine.

Two ranges of hills bound the valley of the Nile—M. Arabicus on the E., and M. Libycus on the W.—leaving an interval of plain varying considerably in extent, but on an average nine miles broad. The only other hill worthy of notice is M. Casius, *El Katieh*, in the neighbourhood of the Mediterranean, on the border of Arabia Petræa.

Ægypt was justly designated by Herodotus the 'gift of the Nile,' and a description of this river embraces almost all that is noticeable in the physical geography of the country. In Scripture it is called Sihor (Jer. ii. 18; Isa. xlii. 3), 'black,' from the colour of the mud which it deposited: the name Nilus is said to be derived from a Sanscrit word of the same signification. Its source was one of the great problems of geography in ancient as in modern times. The opinion of Herodotus has already been noticed. Later geographers, as Strabo and Ptolemy, were aware of the division of the stream in its upper course, and stated that the springs were in the Mountains of the Moon. Nero sent out an expedition of discovery, which succeeded in reaching the sources of the eastern branch, now known as the *Blue River*. Before entering Ægypt, it formed two cataracts; and thence, from the borders of Æthiopia, it flowed in one unbroken stream from Syene to Cercasorus. There it divided into two main streams; and these, breaking up again, discharged their waters through seven channels into the Mediterranean Sea. The ancients regarded the two outside channels—the Pelusiac towards the E., and Canopic towards the W.—as the most important. At the present day, the Bolbitine, or *Rosetta* branch, and the Phatnitic, by *Damietta*, have the supremacy; while the other mouths have disappeared in lagoons, or are become insignificant. Besides the four already mentioned, the ancients distinguished the Sebennytic, *Lake Bourlos*, the Mendesian, *Lake Menzaleh*, and the Tanitic, or Saitic, somewhat to the eastward.

Next to the Nile, the canals and lakes form the most important feature. The Canal of Trajan or Ptolemy connected the Nile in the neighbourhood of *Cairo* with the western arm of the Red Sea. The Lake of Mæris, *Birket-el-Karun*, to the south-west of Memphis, though of natural formation, was adapted by artificial means to receive the superfluous waters of the Nile, and dispense them in the dry season over the neighbouring lands. The Lake of

Sirbo, *Sabakat Bardowal*, was situated in the neighbourhood of the Mediterranean and Mons Casius. The Lacus Amarus, a connecting link between the Nile and the Red Sea—the Lake of Tanis, *Menzaleh*, at the mouth of the Nile—the Butic Lake, *Burlos*—and the Mareotic, *El Khreit*, in the neighbourhood of Alexandria, are also worthy of notice.

Egypt was divided by the Greeks and Romans into three parts—Lower Egypt, or the Delta, *Bahari*; Middle Egypt, also called Heptanomis, *Vostani*; and Upper Egypt, or Thebais, *Said*. A further subdivision was established by the Egyptians into nomes, of which there were, according to Strabo, thirty-six. Middle Egypt derived its name, Heptanomis, from its containing seven of these nomes.

The most important towns and places in the Delta were—Alexandria, which still retains its name, on a narrow tongue of land between Lake Mareotis and the Mediterranean, built by Alexander, B.C. 332, and elevated to be the capital of Egypt; it possessed five harbours; the island of Pharos, surmounted with a lighthouse, lay about a thousand yards distant from the main-land, with which it was connected by a mole: Canopus, about fifteen miles to the north-east, on the Canopic outlet of the Nile, celebrated for its licentiousness: Buto, *Kom Kasir*, on the southern shore of the lake named after it: it was the chief town of the nome Chemmîtes, so called after the island Chemmis, in the lake: Naucratis, on the right bank of the Canopic channel, founded by Milesians, and much frequented by the Greeks, who in the time of Herodotus were confined to this spot: Sais, on the left bank of the Sebennyitic channel, east of Naucratis, the ancient capital of Lower Egypt: Tanis, the Zoan of the Old Testament, *San*, on the south side of the Tanitic Lake, capital of a nome, and, before the time of Psammeticus, the residence of an independent royal dynasty: Bubastus, the Pi-beseth of Ezek. xxx. 17, *Tel-Basta*, on the eastern bank of the Bubastic channel: and Babylon, *Babel*, at the entrance of the great canal from the Red Sea, the border town of the Delta.

To the east of the Delta, properly so called—Heliopolis, in the Old Testament, On (Gen. xli. 45), and Bethshemesh (Jer. xliii. 13), *Matarieh*, capital of a nome, and seat of the famous temple of the Sun; it was situated to the north-east of Babylon, and about six miles from Cairo: Arsinoe, or Cleopatris, near Suez, at the head of the Red Sea (Baalzephon, if not identical with it, was in its immediate neighbourhood); Pi-hahiroth, probably on the site of *Ajeroud*, to the westward of Arsinoe: Magdolum, in the Old Testament Migdol, between Pelusium and Heroopolis: Heroopolis, or Abaris, *Abukecheid*, on the canal to the north of the Lacus Amarus; it is either identical with the Rameses of the Old Testament, or else lay in the district of Rameses: in this neighbourhood undoubtedly lay Goshen, stretching from the Pelusiac arm of the Nile to the border of Arabia Petraea; in a later age we hear of the existence of a place called Vicus Judaorum, and of Castra Judaorum, and there are still some hillocks named *Tell el Jhud*, 'Jews' hills': whether these are to be referred to the first residence of the Israelites in Egypt, or to the time of the Ptolemies, remains doubtful: Pelusium, the Sin of Ezek. xxx. 15, on the eastern arm of the Nile, about two miles and a half from the sea, between morasses and lagoons; it was strongly fortified, and deemed the key of Egypt; its ancient as its modern name, *Tineh*, signifies its swampy position.

In Heptanomis, or Middle Egypt—Memphis, called in the Old Testament, Noph, on the left bank of the Nile, some miles above the head of the Delta, the metropolis of Egypt after the fall of Thebes, and prior to the rise of Alexandria; near it stood several groups of pyramids, and particularly the three largest in Egypt, known as the Pyramids of Cheops, Chephren, and Mycerinus; the spot is now called *Jizeh*: south-west of Memphis, Crocodilopolis or Arsinoe, *Medinet Faioum*, between the Nile and the lake Moeris: near it stood the celebrated Labyrinth, a vast building partly below, partly above ground.

In Thebais, or Upper Egypt—Lycopolis, *Siout*, on the left bank of the

Nile: Coptos, *Koft*, an entrepôt for Indian and Arabian wares, which were brought hither from Berenice and Myos Hormos: Thebæ, in later times Diospolis, in the Old Testament No and No-Ammon, built on both sides of the Nile, the oldest capital of Egypt, far-famed for its size and for the splendour of its temples; its site is now occupied by four villages—*Luxor*, *Karnac*, *Medinet-Abu*, and *Kurnu*: and Syène, *Assouan*, the southern fortress of Egypt, on the right bank; the old geographers drew their chief meridian through this spot. A few miles south, the Nile divided and formed an island, Elephantine, on which was situated a city of the same name; this island was occupied by a garrison under the Persians and Romans. The island Philæ was the last spot in Egypt.

The ports on the Red Sea were—Myos Hormos, *Cosseir*, built by Ptolemy Philadelphus, to the north-east of Coptos; and Berenice, in the parallel of Syene, also built by the same monarch.

To Egypt belonged two Oases, lying in the Desert, to the westward of the Nile, the Great or First Oasis, *El Khargeh*, in the parallel of Thebes, from which it was distant about five days' journey: and the Lesser or Second, *Wah el Bahryeh*, to the south-west of the lake Mœris. They were used as places of banishment by the Romans.

### III. *Æthiopia*.

ÆTHIOPIA, or *Æthiopia super Ægyptum*, as it was more specifically called, the Cush of the Old Testament, lay to the south of Egypt, and corresponds with *Nubia*, *Sennaar*, *Abyssinia*, &c. Its southern boundary is not well defined: on the E. it embraced the coast as far south as Prom. Zingis, below *Cape Gardafui*; westward it was bounded by the Great Desert. It is for the most part a mountainous district, rising gradually to the southward, and ending in the snow-capped Mountains of the Moon.

The Nile divided into two branches, in about 16° of north latitude—viz., the *Astipus*, or *Blue Nile*, and the *White Nile*. It also received the *Astaboras*, *Takazze*, which with the Nile enclosed the kingdom of Meroe.

Æthiopia was tenanted by a vast number of independent tribes, distinguished by the ancient geographers by names indicative of their food or manner of living, but of whom we have for the most part no further information. The places, or tribes, worthy of particular notice are these,—the Macrobiæ of Herodotus, who are supposed to have occupied the territory of the *Somaui*, between the Straits of *Babelmandeb* and *Cape Guardafui*: the Auxumitæ, with the town Axûme, *Aroum* in *Tigre*, between the Astaboras and the Red Sea; the town is supposed to have been founded by the warrior caste expelled by Psammetichus from Egypt, B.C. 650; after the fall of Meroe, it became the seat of an independent and powerful kingdom: Adûle, a flourishing seaport town on the Red Sea, probably in the neighbourhood of *Annesley Bay*: and the Isle of Meroe, the district that lay between the Astaboras and the Nile, about the modern *Schendi*, *Halfay*, and *Athar*; it is said to have received the name Meroe from Cambyzes in honour of his sister, its former name being Saba or Seba; in which case it might be identified with Seba (Is. xlii. 3; Ps. lxxii. 10), the country of the Sabæans, (Is. xlv. 14) and the residence of the son of Cush (Gen. x. 7); the town lay at the junction of the rivers: it was governed by a priesthood, and through the importance of its position as a place of trade, it obtained the supremacy of the whole of North Æthiopia. North of it lived the Nubæ, with the town Napâta, probably the residence of Candace (Acts, viii. 27), though some suppose her to have lived in Meroe. The northern district, bordering on Egypt from the Isle Tachompso to Syene, was named Dodeca-schœnus, the distance between the two spots being twelve schœni. The Romans added it to Egypt, with the title, *Æthiopia Ægypti*. The Isle Tachompso is probably the same as *Derar*.

IV. *Marmarica*.

MARMARICA was the name of the coast district from the border of Egypt westward to Cyrenaica. It was seldom treated as a distinct country: by some of the ancient geographers it was considered a part of Egypt, by others as part of Cyrene. Though now desolate, it is evident that at one time the land was in a high state of cultivation: there are remains of habitations, enclosures, water-courses, and cisterns, which show that no slight pains have been taken to make it fruitful. A low range of hill runs parallel to the sea-coast, which in one spot slopes off from the sea and forms a rising valley, the Catabathmus Major, *Akabah-al-Kbir*, which is the most remarkable feature in the outward appearance of this district. The Catabathmus Minor was a similar declivity of less extent, on the border of Egypt.

The towns on the coast were—Parætonium, *El Boreton*, the asylum of Antony and Cleopatra: Apis, twelve miles to the westward: and Menelai Portus, *Marsa Toubrouk*, where Menelaus touched in his wanderings.

Two Oases, well known to the ancients, lay south of Marmarica—viz., Ammonia or Ammonis Oraculum, *Wady Sywah*, in the east, and Augila, *Aujilah*, in the west. The former of these is in the parallel of Memphis, at a distance of twelve days' journey. It was famous for the temple and oracle of Jupiter Ammon, and for the expeditions of Cambyses, and Alexander. Cambyses started his from Thebes with a vast army, which perished after a seven days' journey in the desert. Alexander followed the northern coast from the Delta, as far as Parætonium, whence he struck southwards, and in eight days reached a city of the Ammonians, *Garah*, and in one day more, the principal Oasis, *Sywah*, on which stood the temple of Ammon, *Oum Beydah*. This Oasis was and still is a great commercial mart for African productions: the caravans to Egypt follow very nearly Alexander's route.

V. *Cyrenaica*.

CYRENAICA, or the territory of Cyrène, lay in the deep curvature formed by the Syrtis Major, and corresponds with the district now called *Dernah*. After the time of the Ptolemies, it was named Pentapolis, from the associated five cities which flourished there. Its early importance is due partly to its geographical position, being the nearest point to Greece and midway between Syria and Carthage, and partly to its extreme fertility: it was occupied in Herodotus' time by the following native tribes: the Asbystæ, in the east; the Auschisæ to the westward; and in the interior, the Nasamônes.

Cyrene, the metropolis of this district, was founded by a colony of Theraeans, B.C. 631, and soon became a place of importance. It stood about eight miles distant from the sea, with numerous ornamental buildings and catacombs; it is now named *Grennah*. Under the dominion of a branch of the Egyptian Ptolemies, from B.C. 321 to 96, it was the head of a confederacy of five cities—viz., 1. Apollonia, *Marsa Susa*, its port; 2. Ptolemæis, *Tolmeita*, the harbour of Barce, the ruins of which cover a circumference of four miles; 3. Arsinoë, or Tauchira, *Taukra*, to the south-west of Ptolemæis, a fortified town on the sea-coast, but not adapted for a port; 4. Berenice, earlier Hesperis, *Bengazi*, in the deepest recess of the Syrtis; near which lay the celebrated gardens of the Hesperides; the nature of the country gave rise to this fable: the ground breaks up into small ravines or chasms, the sides of which are clothed with shrubs, while a level space at the bottom studded with trees gives all the appearance of an artificial garden; and 5. Cyrene. In the interior, to the south-west of Cyrene, stood Barce, *Merjeh*, in the midst of a fine plain, about ten miles from the sea; it sunk after its conquest by the Persians in 510, having gained a high state of prosperity during the half century preceding its fall.

Under the Romans, Cyrenaica formed a portion of the province of Crete.

VI. *Syrtica*.

SYRTICA was the name given to the coast district lying between the Syrtis Major, *Gulf of Sidra*, and the Syrtis Minor, *Gulf of Khabs*. The name is derived from an Arab word meaning *desert*, and was applied to the barren and marshy region about these gulfs. The only rivers in it are the Cinyps, *Cinifo*, and the Triton, *Khabs*, which originally flowed through the series of lakes on the western border—Libyæ Palus, Pallas, and Tritonitis, *Sibkah*—but now discharges itself immediately into the Syrtis Minor, to the eastward of them.

Syrtica belonged originally to the Cyrenians, afterwards to the Carthaginians, and finally to the Romans. In the 3rd century of our era, it obtained the name Tripolitana (whence *Tripoli*), from its three chief towns, which were—Leptis Magna, *Lebdah*, founded by Sidonians, and, under the Romans, a place of commercial importance, as the entrepôt for the inland trade; Cea, probably on the site of *Tripoli*, also a flourishing town under the Romans; and Sabrâta, *Tripoli-vecchia*, a Phœnician town, increased and beautified by Justinian.

VII. *Africa Propria*.

The Roman province of AFRICA, in its most extensive sense, embraced all that lay between the border of Pentapolis in the E. and the river Amsaga in the W.—that is to say, Syrtica, Africa Propria, and Numidia. The original province of Africa was co-extensive only with the Carthaginian territory, and was bounded on the S. by the river Triton, on the W. by the Tusca, and on the N. and E. by the Mediterranean Sea; it nearly corresponds with the *Pashalic of Tunis*.

From the point where the river Triton enters the sea, the coast turns sharply towards the N., and continues in this direction to the neighbourhood of Carthage, where it again returns to its westerly course. The projection thus formed is filled with the ranges of Atlas, which decline towards the sea, forming the promontories, Mercurii, *C. Bon*, in the extreme N.E.; Pulchrum or Apollinis, *C. Farina*, on the western side of the Bay of Carthage; and Candidum, *C. Bianco*, still more to the westward. The only rivers worthy of notice are the Bagrâdas, *Mejerdah*, which rises in the back country of Numidia, and, after a devious course, reaches the sea near Prom. Apollinis; and the Tusca, *Wady Zain*, on the western border. The whole of the province is remarkable for its fertility; it is, however, liable to occasional droughts.

Africa Propria was divided into two portions, Zeugitāna the northern, and Byzacēna the southern half. The chief towns in Byzacēna were—Thapsus, *Demas*, the scene of a contest between Cæsar and Juba; Leptis Minor, *Lempta*, a short distance from the coast; Hadrumētum, *Hercla*, a Phœnician colony, with a harbour named Cothon; Justinian restored its walls, and named it Justiniana; it afterwards received the name Heraclæa; Tysdrus, *Al Jemm*, south of Hadrumetum, a flourishing town under the Romans; and Capsa, *Ghafsah*, in the S., a stronghold selected by Jugurtha for his treasury. In Zeugitāna—Neapolis, *Nabal*, a Phœnician colony, on the Sinus Neapolitanus, *Gulf of Hammamet*; Aspis, or Clypea as the Romans translated the name, *Klibiah*, on a tongue of land south of *C. Bon*; Tunes, *Tunis*, on the innermost point of the Sinus Carthaginiensis; Carthāgo, situated upon a peninsula of about thirty miles in circumference, formed on one side by the inner gulf on which Tunes stood, and on the other by a large marsh or lagoon; the ground rises towards the sea, and breaks off precipitously in that direction; and here stood the oldest and strongest quarter of the city, named Byrsa; a magnificent aqueduct supplied the town with water from a distance of above fifty miles; Carthage was originally founded by Phœnicians B.C. 878, and destroyed by Scipio Africanus B.C. 146; Augustus erected a new town on its site, which rivalled its predecessor in size, and lasted into the middle ages: westward of Carthage, Utica, *Bou-Shatter*, at the mouth



of the Bagradas, which, however, has changed its lower course considerably; after the fall of Carthage, it became the metropolis of the province; it is interesting as the place where Cato ended his life; lastly, Hippo, surnamed Zarytus, *Benzart*, westward of Prom. Candidum; also a Phœnician colony, and a place of importance under the Romans.

### VIII. Numidia.

NUMIDIA was contiguous to Africa Propria; it extended along the shore of the Mediterranean, originally as far as the river Mulûcha, but was limited by Augustus to the Ampsaga: it corresponds with the eastern part of *Algeria*. The name Numidia—i. e., the land of the *Nomads*—indicates the character of its population; the chief tribe was named Massylii, and their mode of life, as described by Sallust, might, with a little variation, be applied to the *Kabyles*, who now occupy it.

The ranges of Atlas traverse Numidia in a direction parallel to the sea-coast, leaving an interval of plain from 40 to 150 miles in width. The chief rivers are the Rubricatus, *Seibous*, which rises in M. Thambres, and discharges itself near Hippo Regius; and the Ampsaga, *Wad-al-Kabir*, on the western border.

The chief towns were—Hippo Regius, *Bona*, west of the Rubricatus, a Roman colony, but chiefly interesting as the residence of St. Augustine; Vacca, later Theodorias, *Bajjah*, an important place of commerce on the eastern border; Zama, *Zowarin*, the residence of Juba, and famous for the battle between Hannibal and Scipio, B.C. 201; and Cirta, *Constantineh*, the capital of the old Numidian kings, situated on a high hill about ninety miles south of Hippo, and surrounded by a very fertile district.

### IX. Mauretania.

MAURETANIA was bounded by the Ampsaga in the E., M. Atlas in the S., the Mediterranean in the N., and the Atlantic in the W.; it corresponds with *Morocco*, *Fez*, and western *Algeria*.

The ranges of Atlas form the prominent physical feature in this country. The main ridge, Atlas Major or Dyrin, *Daran*, rises from the shores of the Atlantic, and traverses the western half of the continent in an easterly direction, forming the boundary between the kingdoms of northern Africa and the Great Desert. In Mauretania, it throws off some important limbs to the northward, M. Phocra and Diur, which form the connecting link between Atlas Major and Atlas Minor; the latter—a range of inferior heights—skirts the northern shore, and runs up into a horn opposite *Spain*, forming the promontories of Abÿla, *Ximicra*, one of the celebrated Pillars of Hercules, and Cotes or Ampelusis, *C. Spartel*. The whole line of coast abounds in promontories, to none of which, however, does any historical interest attach. The chief rivers are—the Chinnûlaf, *Shelif*, which rises in M. Cinnaba; the Mulûcha, *Mulwia*, which formed the boundary between the eastern and western divisions of the province; and the Lixus, mentioned in the account of Hanno's voyage, probably the *Tensift*.

The inhabitants of Mauretania received the general name of Mauri. The tribes had their distinctive titles; the most important were the Massæsÿli in the western, and the Musônes in the eastern part of Cæsariensis. The Romans first became acquainted with this district in the Jugurthine war; it was incorporated in the empire by Claudius, who formed two provinces, Cæsariensis to the E., and Tingitana to the W. of the river Mulucha.

The chief towns were—Cæsarcæ, formerly Jol, *Tenez*, on the sea-coast, the capital of Bocchus and Juba II., and afterwards of the eastern province; Sitifis, *Setif*, in the interior, westward of the Ampsaga; Tingis, *Tangier*, the capital of the western province, near Prom. Ampelusis; and Lixus, *El Araisch*, on the western coast, the chief emporium in those parts.

X. *Libya Interior.*

It remains for us briefly to mention the tribes and places in the interior of Africa, with which the ancients had any acquaintance. South of Mauretania dwelt the Gætuli, in three subdivisions—viz., the Autolales, with the town Autolala, *Agoulou*, on the Atlantic; the Phaurusii, southward, about the 25th degree of north latitude; and the Melano-Gætuli, a mixed race of negroes and Gætulians, to the S.E., in the district now occupied by the *Touaricks*. Eastward of the Gætulians lived the important tribe of the Garamantes, whose chief settlement was the Oasis of Phazania, *Fezzan*, south of Syrtica; they also occupied the southern district, where the tribes of the *Tibboos* now live. The towns of Garama, *Gherma*, Saba, *Sebha*, and Cillaba, *Zuela*, in *Fezzan*, are mentioned. The Garamantes were the most active traders of Central Africa; caravan routes are known to have existed from *Fezzan* to *Bornou* southward, to Leptis and Carthage northward, and to Thebes in Egypt eastward. South of the Gætuli, in *Soudan*, lived the Nigritæ. Two rivers are placed in their district—the Nigir and the Gir: the former is the most westerly, and forms the lake Nigritis, perhaps *L. Debo*, west of *Timbuctoo*; the latter also forms a lake in its mid-course, named Chelonides, and discharges itself into Nuba Lacus, perhaps *L. Tchad*. It is, however, impossible to identify these rivers with any degree of certainty. Some of the towns of the Nigritæ are mentioned, as Pesside, probably *Timbuctoo*, Nigira, perhaps *Jenneh*, and Thamondacana.

Two groups of islands lie off the western coast of Africa: Fortunatæ Insulæ, one of which was named Canaria, whence the modern name *Canaries*; and Purpurariæ Insulæ, *Madeira* and the islands about it, which derived their ancient name from a manufacture of purple dye established on them.

XI. *The Roman Empire.*

It now only remains for us to sketch briefly the rise and extent of that mighty empire which at one time embraced almost all the countries described in the foregoing pages, and became co-extensive with the whole civilized world. Our view will be confined to the Roman provinces in the proper sense of the term, as applied to the conquered countries beyond the limits of Italy.

The island of Sicily was the earliest acquisition, B.C. 241, which was soon followed by the conquest of Sardinia and Corsica, B.C. 238. Hispania was partially subdued B.C. 206, and divided into Citerior and Ulterior; but the subjugation of the north-western tribes was not completed until B.C. 19, after which the threefold division, Lusitania, Bætica, and Tarraconensis, was established. The conquest of Gallia was effected at two distinct periods: the southern district B.C. 121; the remainder by Cæsar in the years B.C. 58—50. It formed four provinces—Narbonensis, which corresponded with the original province, Aquitania, Belgica, and Lugdunensis. Eastward of Italy, Illyricum was partly conquered B.C. 228, and more completely B.C. 168; the Dalmatæ and Iapodes alone retaining their independence until a later period, B.C. 33. Macedonia was conquered B.C. 168, and constituted a province B.C. 148; Epirus in 146; and in the same year, the remainder of Greece, under the title of Achaia. The foundation of the Roman sway in northern Africa was laid after the third Punic war, B.C. 146, when the greater portion of the Carthaginian possessions were incorporated in the province of Africa. The adjoining country, Numidia, was added by Cæsar B.C. 46; Cyrene, B.C. 96; and Egypt, B.C. 30. The island of Crete, which was united with Cyrene in one province, was subdued B.C. 67. In the remaining continent, the first province of Asia was formed, B.C. 129, out of the kingdom of Pergamus, comprising the western provinces of Asia Minor. Bithynia came into their possession B.C. 74; Cilicia, B.C. 66; Pontus and Paphlagonia, B.C. 65; Syria, under which Palæstina was included, B.C. 64; and Cyprus, B.C. 58.

Thus, at the dissolution of the republic, the Roman empire was bounded, in Europe, by the Atlantic Ocean, the British Channel, the Rhine, the Illyrian ranges, and the ranges that bounded Macedonia on the north; in Asia, by the Euxine Sea, the Euphrates, and the Arabian Desert; and in Africa, by the Great Desert southwards, and the border of Mauretania westwards. In addition to this, certain countries had been subdued, but were not yet incorporated in the empire, such as the Pannonians, the Thracians, the Colchians, and Iberians.

Under the early emperors the limits of the empire were considerably advanced. Augustus subdued Mœsia, Vindelicæ, Rætia, and Noricum, B.C. 15, and completed the conquest of Hispania. Tiberius added Cappadocia and Commagene A.D. 17, and reduced Pannonia to a province; Galatia and Lycæonia also became part of the Roman empire, A.D. 25. Claudius conquered Mauretania A.D. 42, and Britain A.D. 43; placed Judæa, A.D. 44, under Roman governors, and made Lycia and Thracia provinces. Vespasian incorporated the islands of Lesbos, Samos, Chios, and Rhodes, in a province named *Provincia Insularum*. Lastly, Trajan carried the boundaries of the empire to their greatest extent, by the conquest of northern Arabia A.D. 105; Dacia, A.D. 106; Assyria, Mesopotamia, and Armenia, A.D. 114.

Thus all that lies between the Atlantic and the Tigris on the E. and W., between the wall of Antonine in Britain and the Atlas range in Africa, and further eastward between the Carpathians and the Great Desert, and between Caucasus and the Persian Gulf, was subjected to the sway of Rome. The permanent boundaries, however, subsequent to Trajan's reign, were the Euphrates on the E., and the Danube on the N., the provinces beyond these rivers having been soon given up. The division into provinces remained until the time of Constantine the Great, who established a new and more systematic system. The empire was divided in four *Prefectures*, which were subdivided into *Dioceses*, and these again into *Provinces*:—I. *Prefectura Orientis* comprehended the following five dioceses, subdivided into forty-eight provinces: 1. *Orientis*; 2. *Ægypti*; 3. *Asiæ*; 4. *Ponti*; 5. *Thraciæ*. II. *Prefectura Illyrici* contained two dioceses: 1. *Macedoniæ*; 2. *Daciæ*; subdivided into eleven provinces. III. *Prefectura Italiæ* contained three dioceses: 1. *Italiæ*; 2. *Illyrici*; 3. *Africæ*; subdivided into twenty-nine provinces. IV. *Prefectura Galliarum* contained three dioceses: 1. *Galliæ*; 2. *Hispaniæ*; 3. *Britanniæ*; subdivided into twenty-eight provinces. In the division of the empire A.D. 395, the two first prefectures formed the Eastern, and the two last the Western Empire.

The recent discoveries of Colonel Rawlinson, in his translations of Assyrian and Babylonian inscriptions, are of great geographical interest, for though they are not as yet sufficiently classified and arranged to afford a complete topography of the countries about the rivers Euphrates and Tigris, yet they confirm and elucidate the accounts of the older geographers, especially of Herodotus, and the Jewish writers, and give sufficient evidence of the advanced civilization, large population, and extensive commerce of those districts, as well as the connexion of Assyria with Egypt and Arabia.

These inscriptions consist principally of records of the conquests of the Assyrian kings, and the divisions of their empire. The former extended over Media, Armenia, Mesopotamia, and Syria, as well as the countries bordering the Tigris and the Euphrates, to the east and west, and on the shores of the Persian Gulph.

The accounts of the northern countries, especially Armenia, are the more full and explicit, 276 towns being reckoned in that and the adjacent districts, while in the country of Tubal, twenty-four kings are enumerated. The expeditions of the Assyrian kings appear generally to have been directed first to

the N.W., where the country was more exposed to their attacks, and then by the N. to N.E., E., and even S., as more or less success attended them. In the catalogues of the towns conquered by them, some are identified not only in Babylonia, or Shinar, as it is called, and Assyria, but in Persia, Armenia, Media, Syria, Palestine, Egypt, and the country at the mouth of the Euphrates.

Besides the general geographical interest attaching to those inscriptions, they throw considerable light on some important points of history: for example, Assur is always opposed to the Chaldeans; we have the limits of the empire of Darius defined by authority; and the locality of the tomb of Cyrus fixed at Pasargadæ in the plain of Morghaub; the correctness of the Persian account of his death being thus fully confirmed.

Babylonia is only known in the inscriptions as Shinar, which may possibly be the same as the Singara, or Sinjar, of Histiaeus, a name preserved in the hills between the Euphrates and Khabour to the west of Mosul and the village below them; it is also written Sinkar, or Senkerah, and was, Colonel Rawlinson supposes, probably the Lancherah of Berossus; and afterwards the Athra or Otiris of Pliny; its inhabitants were Chaldees; its chief city, after the accession of Nebuchadnezzar to the throne was Babylon, "the glory of the Chaldees' excellency;" Babel, the Gate of God; indeed almost all the principal cities of the Babylonian Empire seem to have been built by Nebuchadnezzar; the name of that king being found on the bricks of which they were composed. Among the localities especially pointed out by Colonel Rawlinson are—1. On the Iskahlah Canal, 15 miles N. of Bagdad. 2. On the right bank of the river at Bagdad. 3. At Nearkan Kabya, on the road to Hillah. 4. At Akerkerf, called by Arabs Palace of Nimrod. 5. Near Khan-i-said. 6. Zaleh on the River Euphrates, near Musaib. 7. The City of Cutha, Lat.  $32^{\circ} 41' 36''$ , Long.  $44^{\circ} 42' 26''$ , apparently almost equalling Babylon in extent; also at Kalwadha, Hymar, Birs Nimroud, Beth Digla, Beth Sida, or Beth Djehda, and others, the latter being one of the most famous cities of Babylonia.

It should, however, be noted that Mr. Layard and others consider the ruins at Nimroud, Karamless, Khursabad, and Kuyunjik, to be palaces at the angles of one great city, they forming, according to Colonel Jones' survey, an exact parallelogram. The word 'Nimrod' appears as the passive form of a verb, and may mean 'the settlers.' Chaldea appears identical with Calah or Halah, Halah, forming Caldi or Haldi, and cognate with Phut and Phutiza; the Assyrian name of Calah was Levekh, i. e., Larissa, probably the Lachisa of the Samaritan Pentateuch. Colonel Rawlinson appears to identify this city with the ruins at Sirpul Shah, with the Halus of Tacitus, and with Holman, as he does the sister city, Resen or Dasen with Yassen Tappeh in the plain of Shah Rigor, the seat of the Dassen Khurds. These, however, ought to belong to Assyria.

The city named in the Book of Genesis, next to Babel, Erech, Colonel Rawlinson identifies with the Ur of the Chaldees, named in the history of Abram, and the Warka of the inscriptions; he supposes it to be the Camarina of Eupolemus, and the Orchæ of the Greeks. The ruins are of stupendous magnitude, and being under examination, may be expected to yield much information to the explorers; but it should be observed that Warka is elsewhere placed by him in Hyrcania, and that Mr. Layard sees no reason whatever to suppose Ur to have been in that locality. The chief cities of the Chaldees were, however, to the south.

The country about the mouth of the Euphrates was called Beth Jakinah; there were seven kings of the Jakanatsi in the land of Yatnan, near Taha Dunis, which, with Beth Takarah and Beth Eden, were the chief cities. The ruins at Mugheir or Nunwaweis, will probably prove to be those of one of these three cities. Yetenira, a name not dissimilar to Yatnan, is named as a dependency of Susiana. Zazana is named as a city near Babylon, and Dobana as a district appertaining to that city. Pekodli is also named as a town in Shinar. It may be noted that in Babylonian, the Euphrates is

called Euperatah, in Assyrian Berat or Pherat, which approaches nearer the Jewish word, and is also the name or title of the monarch, and of which the Babylonian appears the corruption.

Of Assyria itself less information is obtained from this source; it appears however to have been named from the god Assarac, which name may have some preconnexion with that of Assur; it is also called Zahiri. The plains of the city of Assaraminch below Nineveh, as well as those of Lamblinal, are mentioned in connexion with the country of Dagini, as the latter is with Ararat, which would lead to the supposition of an error, either in the inscription or the reading. Khursabad is identified by Colonel Rawlinson with Sargina, the city of Sargon, Kuyunjik with Mespilah, and Nebbi Yunus with Nineveh, on the Tigris, opposite Mossul, called also Beth Arkstonia, and said to have been built after the manner of Egypt; Niffer, or Tel Anu, the city of the moon, appears to have been the residence of the Assyrian kings, before Nineveh was built; it is situated near the mouth of the Kercha; reference to this is, Colonel Rawlinson thinks, probably made by Isaiah c. xxiii. v. 13. Chage also was between the Tigris and Kercha, and according to Dicaearchus, Babylon was built by Emigrants from that place, but, as Mr. Layard well observes, the crowding so many large cities so closely together is warranted neither by history nor analogy.

The catalogue on the bulls in the plain of Nimroud, commemorates the conquests of Temenbar II., son of Sardanapalus or Asaradonpul from W. to N. and by E. to S. in the following order:—the Nahiri, Khamana, and Sheta, the countries watered by the Tigris and Euphrates from Belats to Hakim, and thence to Melinda, to Dagani, to Arzekan, to Latsan, to Hubiska, the Arians and tribes of Chaldees on the coast.

The limits of the dominions of the Khursabad kings are thus stated. Assyria, Babylon, the Sahiri, and Hekti, from Yetnan, as far as Misr and Mesek—i. e., lower Egypt, Maratha, and Saccan, on the sea coast of Phœnicia. The land of the Sheta, Media, Vakania, (possibly the same as Veklanya, the land of the Vakki,) Ellenbi, Sasi, Susiana, and numerous cities on the Tigris, Passitigris, and Eulæus. In the eleventh century, before the Christian era, the limits of the Assyrian empire were from the Persian Gulph to the Mediterranean, but did not include Syria or Asia Minor.

Of Persia, also, the information obtained is rather historical than geographical. We have, however, the divisions of the empire of Darius given as twenty-one, thus—

1. Persia; 2. Susiana; 3. Babylonia; 4. Assyria; 5. Arabia; 6. Egypt; 7. Those of the sea; 8. Sparta, probably the Dorian colonies; but in the time of the Maccabees, the Jews claimed kindred with the Spartans; 9. Ionia; 10. Armenia; 11. Cappadocia; 12. Parthia; 13. Zangaria; 14. Asia; 15. Chorasmia; 16. Bactria; 17. Sogdiana; 18. the Sacæ; 19. Sattagydes; 20. Arachosia; 21. The Medians; and, in addition, Cyganaca and Racha, are named as cities of Persia; on crossing from Persia through Media, Katsir is reached, then Kharkkar, the cities of Kakhidra, Tarzanem, and Isleban, which must therefore have been in or near Armenia. In Media we have the district of Kapuda named, and Gedrosia as a city: Rhages is identified with Margiana; Gadytia is named as a district of Arachosia, and Capyscutia and Arshada forts in the same.

Of Armenia, which was evidently the debateable land of Western Asia, we have more details. The wars of the Assyrian monarchs being chiefly in that country, hence the number and variety of names preserved. On the north of this the country of Ararat is placed, and to the west that of the Sheta, to the South Aram Bedan, probably Padan Aram.

Of Ararat we have the following notices:—The capital was Arkarkhan, and while eighty-seven cities are said to have been situate in the land between Armenia and Ararat, in the latter one hundred are named; Habbaril, of Ararat, is said to have received tribute of the King of Shetinah, gold, silver, horses, sheep, oxen, &c.; the Hekdi and Shesha are there located; to the east is the land of Kharka, probably the modern Khorkhor or Van. Nukatseri,

or Nuzatserie, appears to have been another name for this country, the cities in which, after its conquest by the Assyrians, received the names of their Gods, as Taha Nebu, Taha Bel, Taha Ashteroth. This is also the country where the Ark of Xixuthrus is supposed to have rested, according to Alexander Polyhistor, quoting Berosus; from Assyria it lies across the Zab, and in the same direction we have the cities of Hubiska, Mela, and Minni, probably the Ararat Minni of Scripture, (see Jeremiah li., 27), with its chief city Tchikarta, given in order, and in the account of the raid or predatory excursion, in which they are enumerated, they are followed by Mesarta with its capital, Kharta, the country of Sardera and Persia.

The Askenaz of Scripture, mentioned in connexion with Ararat Minni, is probably Arzeskan. Beyond the river Zab the plains of Larri and Ladsan are said to extend as far as the cities Tel Abtan and Tel Zaledan. In the account of another raid, commencing again with Hubiska, Bagatsiri is mentioned as a district having thirty-six towns, besides its capital, Anseri—fifty cities are also named in Armenia. Ladsan, Barrianæ, and Kharran, or Sharran, are mentioned as districts in connexion with Minni, and beyond them the cities of Biharia and Liliharia. In Persia the cities of Bairet and Shel Khamana, of course, on the east side of the Tigris, while the district Khamana appears to have been on the west. Akarinia, supposed to be Kharta, is mentioned on the sea coast, and Mesek, in other inscriptions, meaning Lower Egypt, is in one named as in Armenia. The return was through the country of Kharets, descending into the plains of Eones above the country of Umen. In this 250 cities were despoiled. Lasan evidently joined Armenia, and may possibly be the same as Laz or Lazisthan. The similarity of names, however, makes localization dangerous, as in another raid, commencing more to the west in the country of the Nahiri, (between which country and Ararat Isibarta, possibly the same as Hiritissa, is named), the Khamana and Sheta, the route is through the countries watered by the Euphrates and Tigris, from Belats to Shakem, by Melinda, Dagain, (this place paid tribute in horses,) Arsekan, Latsam, and return by Hubiska, the Arians, and tribes of Chaldees on the coast. The city of Hindara is elsewhere named as the stronghold of Ellula or Melinda. Across the upper Euphrates, Kanala is mentioned as capital city of the Shetinah; Lek, not of course the modern Lek or Ladak, is named as a mountainous district to the north, and in connexion with the city of Shenala, or Shenaba. Beyond the Upper Euphrates the lands of Khamana and Malar are named the city of Tel Barabra, Bithen, between that river and Arteri, and Sitrat on the Euphrates; in the same direction we have also the plains of Elels, Dagini, and Enem; to the south of these Lerzan and Hubiska, the country of Shelar, or Kellar, the district of Zoba, and city of Yedi, and beyond, the city of Erri, in the district of Abyarri.

The Bilikh, an affluent of the Euphrates, above the Khabor, is named as Belak, and beyond it the cities of Tel Alask, Habarciny, and on the opposite side of the Euphrates the country of the Sheta and the city of Muen, which, from the other catalogues, would appear to have been on the east of the Tigris; in continuation of this route we have Barbara, the country of Atesh, a name also found in Syria, the country of Telati towards the east, the city of Taha Dunis and land of Beth Takara, and still further east or south the land of Shinar.

Towards the north-west, beyond Khamana, we find the country of Berbini, the city of Bahura and Tanakem the stronghold of Ettak, Leman beyond Tanakem, and Nethels beyond Leman. These belong to the mountain districts of Lebanon, as appears from Colonel Rawlinson's identification of names on the monolith of Sardanapalus at Calah, on which the names Lemenen, Hamana, Lebanou, Shenir, are mentioned together, and from the same authority he classes the following names:—Atesh Hems, or Emessa, supposed, from St. Jerome, to be the same as Edessa, Husubrian, Sidon, the greater and the less, Beth Zitta the City of Olives, Sarepat Sareptah, Mahallat the

ascent, Tyre, Kksip Eksippa, Akkia or Akkra Acco, or Acre, Khazitis Cadytis, Gaza Rhinocorura, Alakis Lachish, the Larissa of the Greeks, the scene of Pompey's death, the name of which was transferred to Assyria; between the last-named towns Asuda Arvad, Gubal Byblos, Ashdod, Beth Ammon, Ascalon, Ekron, Hudemiah Yatunan Ethnan Edom, Sela Petra, Lubanah Libnah. Near Ashdod the city of Shenakti, probably Askelon, is named as given to the Yavanah, who the Colonel thinks may possibly be the Ionians, and their leader Methati of Atheni, Melanthus of Athens.

Misir appears identical with the Persian Mudrayah, *i.e.*, Egypt, Mirhuka with Meröe. To the north of Palestine we have Atesh, and beyond the country of Telati towards the head-waters of the Tigris, in the country of Khumana, Yeri the city of Esdinak is named, and near Hamath, eighty-nine independent towns. Khamana is of course the Amana of the Greeks. Near Atesh are also placed the countries of Lemnan, Berabin, and Tubal, with twenty-four kings; beyond Alta and the gold country of Belin.

The following names, mentioned in Scripture, besides those already noticed, Colonel Rawlinson considers as identified:—Gozan, Haran, Rezep, Eden, Thelasar, Calno, Carchemish, on the Euphrates, Arphad, Arvad and Aroer, as well as the Arab tribes of Kedar, Hazor, Sheba, Teman, Nebaioth, Dedan, and the Hagarenes; the Tigris, the Euphrates, the two Zabs, Hermas and Khaboor rivers. To these Mr. Layard adds the names of Elam, which he identifies with Sardiana, Shusan, Meshek, Tubal, Pethor, Samaria, Harran, and Ur, Khasri, the Chauser river, and the plain of Dura. The native forms of Cilicia, Comagene, Sophene, Gazarene, and most provinces named by Grecian geographers, are also found.

Ethnological facts of much value are to be obtained from these inscriptions. Akkadimi, 'the East,' is the term applied to the country of the Chaldeans, Armenia, and Babylonia; but Assur, as already noted, is always opposed to the Babylonians. The most important race in these countries were the Scythæ, called also Sacæ, Saci, Sacan, Tzimri; they dwelt on the Tigris, in Babylonia, Assyria, as well as the north and west towards Syria, in Khamana, Beth Hebra, and Tubal, and are distinguished as warlike Nomad horsemen, from the located and resident agriculturists whom they subdued. They appear to have been divided into two tribes, the Humarga—the Amurgiri of Herodotus—and the Tigrak-Huda, or bowmen, to them the tablets, called Median, are inscribed, and, Colonel Rawlinson thinks, the Cymri, Celts, Slavonians, and Teutons, as well as the Finns, Turks, and Magyars, were included in their families.

The Assyrians are mentioned as a colonizing race, and as forming settlements in all their conquests.

The Arians are located below the Persians, and again across the Zab, and the Sketa next to them, near the coast. This tribe, or people, as has been shown, were also located with the Khamana on the west of the Euphrates, above the Khaboor; these are supposed to be identical with the Katti or Hittites. The Nahiri about the head waters of the two rivers, their country the Naharaim of Scripture, are named in connexion with Hamath, as is also the tribe Yehuda. Rabek, the principal city of the tribe of Khulban, is identical with Heliopolis. The Sattagydis and Medians have already been named as the nineteenth and twenty-first divisions of the Persian Empire under Darius.

Several Arab tribes on the banks of the Tigris are named the Yetah, Rebiah, Keril, Lemdod, Khemoran (Kamarina of Eupolemus, near Ur of the Chaldees), Hichil, Ruhna, Luhti, on the rivers of Susiana the Tebilu, Akindara, Bilder, and Sati.

The character of the different races is discernible from the tribute paid by them, the northern nations gold and cattle, the western, as the Dagini, horses, the commerce of the Chaldees to the south is represented by gold, silver, gems, and pearls.

# MARITIME DISCOVERY.

## INTRODUCTION.

COMMERCE is the daughter of peace and the bond of unity between nations. It was therefore reserved for the period of the dispensation of peace and good-will among men to spread commerce over the globe, and link together in her golden chains those before separate and unknown to each other. Commercial relations must have their origin in interest, and the origination of them must offer large profits as its inducement. Yet the intimacy of these relations tends to equalize the condition of all men—makes known to all their universal brotherhood and common origin; and though at first the savage may receive for the valuable natural productions of his country what to the civilized man may seem a trifle, it must be remembered that it is to him, nevertheless, a sufficient return, and that he is further rewarded by his introduction to the arts and sciences of civilized life, as well as to that religion of which civilization is the accompaniment.

Commerce does not, however, often recognise her true mission; yet the eternal law of nature remains, and she fulfils it, though imperfectly, and, as it were, in spite of herself; and in its fulfilment, she thus brings into intimate communion the inhabitants of the world. The History of Discovery is therefore, in some sort, the History of Commerce; and as the greatest commercial power on the globe, or, indeed, that the world has ever yet seen, is Great Britain, every Englishman must take a personal interest in its narrations; nor will he have reason to be ashamed at the perusal. If not the first, her sons are certainly the most numerous in the ranks of those who have opened to Europe the knowledge of the rest of the world. If we cannot claim as our own Columbus, De Gama or Magelhaens, Polo or Balboa, we have names enough and to spare, and neither the glory of the Spaniards nor Portuguese need excite our envy; for if to them be allotted the first place in discovery, to us must be conceded the first in colonization; for while the empire conquered by them has passed or is passing into other hands, that established by us has extended far wider than theirs ever did, and seems to promise the subjugation of the greater part of the world to our descendants.

The honour of maritime discovery has passed from nation to nation with the empire of the sea. At first historically confined to the Mediterranean, it was in turn possessed by the Phœnicians, Carthaginians, Greeks, and Romans; and again, by the Venetians and Genoese; and under their direction, the Portuguese and Spaniards extended it beyond the narrow limits of that inland sea, but not until indications of the route to be pursued had been obtained from the labours and travail of those who had endeavoured to extend their commercial relations by land. We may, indeed, safely assume that the progress of discovery has been by gentle degrees, although they have been forgotten in the fame of those more extended and daring adventures which resulted from them. In the account of geographical discoveries, Europeans must of course start from their own earliest knowledge; but preceding and parallel with its advance, other discoveries were necessarily going on, by which mankind had been spread over the globe; still the maritime power possessed by them has been at all times so much greater than that of any other people, that the world may be considered as indebted to them for its personal knowledge of itself and its relations.



But although, both with respect to Europeans generally, and the rest of the world more particularly, we are indebted to commerce for our geographical knowledge, there is one exception to this rule. The Northmen, whose discoveries on the continent of North America were unobserved or unrecorded by the other nations of Europe, seem to have been led to foreign lands almost entirely by their love of wandering and habit of living by plunder; and it is a problem well worthy the attention of the ethnologist, how far the infusion of northern blood may have influenced the discoveries of other nations. To them, however, we are only indirectly indebted for geographical information; it has been the endeavour to open a passage by sea for the trade of the east, that has extended the knowledge of the surface of the globe, the monopoly of that trade by the Venetians leading to the discovery of the route by the Cape of Good Hope and of the New World, and to the full tide of discovery by the Spaniards and Portuguese, the Dutch, French, and English, in the 15th and 16th centuries.

## CHAPTER I.

§ 1. Commercial intercourse of the middle ages.—2. Missions to the Tartars.—3. Causes of the extension of discovery: the mariner's compass.—4. The conquests of the Moors; Portuguese discoveries in Africa.—5. Columbus.—6. Discoveries of the Northmen.—7. Character of Columbus.—8. Discoveries of the Spaniards.—9. Successors of Columbus.—10. Era of conquest.—11. Vasco de Gama.—12. Conquests of Portuguese.—13. Magelhaens, his circumnavigation.—14. Pope Alexander's division of the world; its consequences.—15. Consequences of discovery to Science.

**C**OMMERCIAL *Intercourse of the Middle Ages.*—After the irruption of the barbarians into Southern and Western Europe, and the consequent dismemberment and suppression of the Roman empire, the knowledge which the Romans had acquired of distant countries by their relations with other nations, was for a time partially obscured, until, rising out of the commercial chaos that followed, the republic of Venice secured, and for a long period monopolized, the commerce of the East.

The principal channels of trade had been Constantinople and Alexandria, until the conquest of Africa by the Arabs and their encroachment on the territories of the Eastern Empire aroused Western Europe, and excited the Crusades. To those wars is to be attributed the maritime power of the Italians, as well as the English; for while the former were the carriers of Europe, the latter from her isolated position was obliged to be dependent on her own resources; nor did these prove insufficient. The same necessity had maintained her marine for the purposes of commerce from the time of the Romans. The descents and ravages of the Danes on her coasts had, from the time of the great Alfred, inured her children to maritime warfare, as her fisheries had to a maritime life; so that the fleet with which Richard her Lion King, sailed to the Crusades, was the admiration even of the Sicilians. Her sailors signalised their nautical skill and courage by conquest over the galleys of the Saracens, and the Isle of Cyprus rewarded by its submission the boldness of their leader.

The customary channels of commercial intercourse with the East being closed by the Saracens, the Venetians and the Genoese re-opened the older routes across the continent. By one of these merchandize was transmitted from Bassorah on the Tigris, and by that river to Tabriz, near the Caspian, and from thence across Georgia, by the Black Sea, to the mouth of the Don; while from Tabriz light goods were also conveyed to Aias or Ajazzo, in the Gulf of Iskenderoon, at the north-east angle of the Mediterranean. By the other route, merchandize was brought from the river Indus, across Bokhara, to the Caspian, and from Astrachan, along the base of Caucasus, to Azov.

Caravans from China also followed this route; but in 1260 the Genoese restored the Greek emperors to the throne of Constantinople, and having obtained from them the monopoly of the trade of the Black Sea, the Venetians entered into a commercial treaty with the Sultan of Egypt, and Alexandria became once more the emporium of the commerce of the East. The countries through which commercial intercourse had been previously carried on, were of course sufficiently well known to those who traversed them; but these had been principally Asiatic merchants, those of Europe being, for the most part, limited in their personal labours to the shores of the Mediterranean and Black Seas; but the rise of the power of the Monguls under Zenghis Khan, at the commencement of the thirteenth century, the ravages of his lieutenants, and the fears of the petty princes and governors of Western Asia and Eastern Europe, soon made the interior of Tartary better known than it is even now, from their frequent embassies to her capital, Carracorum; for before the middle of that century, the successors of that monarch had extended his kingdom from Hungary to China. Subsequently, the conquest of Georgia and Armenia brought the Monguls into collision with the Saracens and Turks, and Christendom began to hope that her own advantage, and even extension, might arise from the contest between her enemies. Traditions, probably relating to the Nestorian Christians and to Abyssinia, becoming current in the West, raised the hope, if not the belief, that Christian kingdoms would be found beyond those countries occupied by the Saracens; and this, confirmed by reports brought to Europe at a later period, both of the character of the Tartars, their difference from the Saracens, of the kingdom of Prester or Presbyter John, the Christian king and priest in India, originated and sustained schemes for uniting the Tartars and the Christians against the Mahometan conquerors of Western Asia, and led Pope Innocent IV. to send missionaries to convert the Khan and his subjects to the Christian faith, and bring them into submission to the authority of the successor of St. Peter.

2 *Missions to the Tartars.*—The Pope and the Tartar chief were, indeed, at that time the most important persons in the world; for though their power was limited by that of the Christian kings on the West, and the Mahometan empire on the east, yet their union, in opposition to the latter, if successful, as it could not but have proved, would, no doubt, have given the Empire of the West to the one, and that of the East to the other. This, however, the hierarchical pride of the missionaries prevented; and when, afterwards, through geographical discovery, the Pope thought to enlarge his dominion both in the West and in the East, Providence, in the presence and domination of the Anglo-Saxon race, ultimately frustrated his intentions, and established in both a Protestant power equal to any in Europe. The Franciscan Ascelin, whom he sent southward through Persia, met only with insult and contumely; nor did the more prudent Minorite Carpini fare much better. He had, however, an audience with the Great Khan, at his court in Bokhara; and having travelled to that country overland through Poland and Russia, he has transmitted to posterity an account of his journey and of the Tartar nation. He, moreover, gave a fabulous relation respecting Prester John; and to him may probably be attributed the first particular account of that prelate.

While the French king, St. Louis, was engaged in his crusade against the Saracens in Egypt, he received an embassy from a Tartar chief, named Erkaltay, who was then engaged in war with the Saracens in Persia. This induced him to send one William de Rubruquis, or Von Ruysbeck, a Belgian friar, as ambassador to that prince. De Rubruquis followed the same track as Carpini, confirming and enlarging his accounts of the Tartars and Prester John, as well as giving further indications of the existence of rich and powerful kingdoms in India. He found numerous Europeans at the court of the Khan, and from him we learn that Italian merchants had farmed from the Mahometans the monopoly of the alum works in Asia Minor, which, until the fifteenth century, supplied all Europe.

As the Arabians, being themselves a commercial people, had, on their

conquest of the west of Asia, closed the Alexandrian and Syrian routes against Europeans, the journeys of Carpini and De Rubruquis, by opening new channels for commerce, excited to new adventures the merchants of Italy; and, accordingly, in 1254, two noble Venetians, Maffeo and Nicolo Polo, crossed the Black Sea, and after various adventures, arrived at the court of the Khan, from whence they were sent back with an ambassador to the Pope, who dying on the journey, they reached home after an absence of fifteen years. In 1271, taking with them Marco, a son of Nicolo, who had been born and grown to manhood during their first absence, they returned, with letters from Pope Gregory X. to the Great Khan, whom they found in China. He received them with great honour, and young Marco was adopted into the household of the Tartar monarch, where he acquired a knowledge of the languages of the East. He was afterwards made governor of the imperial city, Yang-tchou-fou.

Seventeen years did the brothers Poli remain at the Tartar court, and were then sent as ambassadors to Persia, with a princess betrothed to the Mongul ruler of that country. Obligated to return, in consequence of the disturbed state of the frontiers, they proposed to convey her to her future home by sea, in consequence of the report given by Marco of the ease with which the Indian seas might be navigated, he having then returned from a voyage to the Indian islands. They accordingly sailed with fourteen ships, some having as many as 250 men on board, laden with presents from the Khan, and arrived safely at Ormuz; but finding a revolution had taken place in Persia, they left the expedition to return back, and passing through Armenia, arrived at Venice, by way of Trebizond and Constantinople, after an absence of twenty-four years. Subsequently, Marco, having been taken in a naval engagement with the Genoese, and detained prisoner at Genoa, wrote there those accounts which stimulated the spirit of discovery and commerce in the middle ages, and which, bringing to the knowledge of Europeans the western shores of the Pacific, may be considered as the exciting cause to the discovery of the New World.

The natural riches of the countries in the east of Asia, though doubtless exaggerated in the accounts of these and other travellers, were sufficient to give great stimulus to the eastern trade of Europe. The fisheries of the north opened commercial relations between the cities of the Hanseatic league and the republics of Italy. The Moors introduced the luxuries of the East into Spain, and thus the spirit of commerce pervaded Europe.

At the present time, when every one who travels, even into countries already well known, presents the world with his experiences, the facility with which the caravan-trade through Tartary to India was carried on during the 14th century, can, in the paucity of accounts, be scarcely appreciated; and yet the Itinerary of Pegoletti of the route 'from Tana to Cathay with merchandize and back again' is sufficient to show that this trade was regularly organized and carried on without difficulty. By this route, for the purposes of commerce, the East was visited by Europeans from all parts of the West and South; and among those who have left accounts of their travels, Oderic of Portenau and Sir John Mandeville ought to be noted as exercising no inconsiderable influence. The former was canonized so late as the 18th century; and as the religious marvels for which he received that now very questionable honour are sufficiently mendacious, it would have excited no astonishment had the other portions of his narrative proved equally unworthy belief. He appears, however, from certain minute facts which he has recorded, to have passed into India and China. The latter probably never went beyond Palestine, but derived his accounts from the Arabian travellers, and the romances of the Scandinavian and Arabian writers. Notwithstanding this there is no doubt that many of his accounts were believed; and his description of the court of Prester John, at which he says he was received, confirmed and increased the general faith, not only in the riches but the Christianity of a large portion of the people of the East; and the jewels

brought home by the Poli were sufficiently numerous and valuable to excite cupidity and admiration, and afford to ardent minds a satisfactory evidence of the truth of stories such as those of Mandeville, of tables of emeralds and of carbuncles a foot long, the radiance of which illuminated the palace at night. The narrative of the Spaniard, Ruy Gonzalez de Clavijo, who, in consequence of the favourable reception of a previous embassy, was sent, in the year 1403, by Henry III. of Castile, to the court of Timur, then held at Samarcand, is of far more value, enlarging the accounts of former travellers; and from this time Spain and Portugal entered with spirit into the great commercial contest for the monopoly of the trade of the East.

3 *Causes of the Extension of Discovery: the Mariner's Compass.*—The conquests of the Moors had attracted to Spain the ardent spirits of all nations, even the extreme north of Europe; they brought with them whatever knowledge of other countries their own possessed. The Moors had introduced into the Peninsula the luxury and love of splendour proverbially Eastern, which the Spaniards and Portuguese were not slow to adopt: they had also made the Arabian language and Arabian learning common in Western Europe, and thus facilitated the transmission of the commerce of the East from their own hands into that of their enemies.

In preparation, too, for more extended discoveries, science, which the Moors had introduced into Spain, had not failed to contribute. The properties of the magnet had, indeed, been known for centuries, a Provençal poet at the court of Frederic Barbarossa having in 1181, described it as useful to guide the mariner at sea; its use, however, now became general in the West, as the Arabians had already made it in the East; indeed, so early as 1269, it was known, even in its variation, to the Germans, as we learn from the physician, Peter Adsiger, though its introduction is usually attributed to Gioja of Amalfi, in 1302.

4 *The Conquest of the Moors; Portuguese Discoveries in Africa.*—The conquest of the Moors in the West was, so to speak, the first step to the conquest of the world; in this, Portugal led the way by carrying the war into Africa. King John, in 1415, took Ceuta, and gave the government of his conquest to his son, Don Henry, who, three years before had shown his desire for maritime discovery by despatching ships to the west coast of Africa: and from that time till his death he never intermitted his exertions. Until 1418, however, the Portuguese mariners had not passed Cape Bojador, when the attempt of Joham Gonzalvez Zarco and Tristam Vaz Texeira to double that Promontory, led to the discovery and colonization of the Canary, and the occupation of the Madeira Islands, by them and Bartholomew Perestrelo; both of which had, however, been previously known to the Spaniards, the English, and even the Normans, who had probably extended their voyages beyond Cape Bojador, although the perseverance of the Portuguese has justly secured to them the honour of permanent discovery on that coast; and in 1433, it was rewarded by the return of Gil Eannez, or Gilianez, as he is usually called, after doubling that cape, with satisfactory accounts of the coast beyond, and the facility with which it might be reached by sea.

The knowledge of the previous expeditions of the Normans no doubt induced Don Henry to apply to Pope Martin V. for a grant of all the countries he might discover in that direction. If his predecessors had required the submission of the Great Khan to their authority as the viceregents of God upon earth, it was but a small thing that he should grant to a Christian prince the dominion of unknown lands peopled by Mahometans or Pagans, especially as it presupposed their being brought under the rule of the Holy See; and the application was a recognition on the part of the King of Portugal of the universal extent of his own authority; and accordingly the perpetual donation of all lands or islands between Cape Bojador and the East Indies was made by him to that crown. This places beyond doubt the object of Prince Henry to have been the attainment of the commerce of the East by circumnavigating Africa. The Arabs had brought into Spain and Portugal

the literature of Greece; and the voyage of Nearchus and reported voyages of the Phœnicians and Egyptians round Africa, could scarcely have been unknown to him. Thus, one discovery leads to another—the knowledge of one fact to that of another. Mankind is always advancing—always accumulating—laying up in store for generations to come. But to commercial, religious ardour and enthusiasm were—as in the East, so now in the West—made auxiliary. The wars against the Moors had been esteemed religious wars; plenary indulgence had been granted to those engaged in them, as in the Crusades; and it was now extended to those who should rescue the unknown regions of Africa from the hands of the infidels and pagans, and enlarge the dominions of the Holy See; and thus the spirit which had crowned with success the Spanish and Portuguese arms in the Peninsula and in Africa, was now invoked in aid of maritime discovery.

In 1441, Antonio Gonzalvez and Nuno Tristan reached Cape Blanco, and having taken some Moors prisoners, obtained for them the next year, as ransom, gold dust and negroes; and then commenced that trade which has been the disgrace of Christendom and the curse of Africa until this day. To these navigators is by some attributed the discovery of the Cape de Verd Islands—an honour usually conferred on Antonio Noli, in 1450, but which were visited by Cada Mosto in 1456. In 1445, Dinis Dyaz, or Fernandez, as he is more usually called, passed the Senegal river, and reached Cape Verd; and in 1449, the Portuguese had colonized the Azores, which had been previously discovered by the Flemings. These successes having attracted Venetian navigators to the court of Portugal, Prince Henry availed himself of their scientific knowledge, and had his recent discoveries more accurately examined. One of these navigators, Aloisio de Cada Mosto, a Genoese by birth, published an account of these countries, to which, by Don Henry's permission, he sailed in 1454; from this it appears that the Portuguese obtained from their inhabitants a knowledge of Timbuctoo, of the Great Sahara, and of Lake Tchad. It is remarkable that he supposed the Senegal to be connected not only with the Niger, but with the Nile, and that generally the great rivers and lakes have been supposed to intersect the continental masses and unite opposite oceans. Such an opinion led Alexander the Great to survey the Caspian—possibly to the circumnavigation of Africa—certainly to our knowledge of the western and northern coasts of America.

In 1456, Cada Mosto again visited the river Gambia; and about six years after, Pedro de Cintra gave the name Sierra Leone to the mountains which now bear it: but to the death of Don Henry, in 1463, a temporary suspension of maritime discovery succeeded. It is marvellous that, with such clear views, such extensive means, and such devotion to one object, as are expressed in the life of that prince, the discoveries of the Portuguese during half a century under his direction should not have reached the equator; yet it does not appear that there was any want of energy or perseverance. The development of all great things is slow: we must not despise the day of small things.

The knowledge of the existence of gold has always been among the greatest incitements to extended discovery. In the middle of the fifteenth century, gold had been imported in considerable quantities from the coast of Guinea, and in 1469 the monopoly of the trade was given to Fernando Gomez; but to this, as to every similar grant in those times, was attached the obligation of extending discovery, and in consequence the islands on the coast, as far as Anabon, in lat.  $1^{\circ} 24'$  south of the equator were discovered; and the knowledge of the coast of the main-land extended as far as the northern limits of Congo. The accession of John II. gave a fresh impulse to the spirit which Don Henry had evoked in the breasts of the Portuguese, and in 1471 the Gold Coast was discovered by Juan de Santarem and Pedro de Escobar; and on the accession of John II. in 1481, though not without difficulty, a fort was erected by Diego de Ambuza, called S. George del Mina, afterwards popularly El Mina, on the coast of Ashantee; the king, upon this, assumed the title Lord of the Gold Coast, and obtained from the pope a con-

firmation of the grants made to Don Henry, accompanied by a strict prohibition against the intrusion, within the limits conceded to him, by any other Christian king. Nor was this caution inoperative, for it proved sufficient to induce Edward IV. of England to discourage the enterprise of his subjects in that quarter.

In 1484, Diego Cam discovered the river Zaire, or Congo; and extending his voyage to the south, returned with ambassadors from the negro sovereigns of that country, who, being baptized in Portugal, missionaries were afterwards sent back with them to Africa; from some of these the king received accounts of a monarch, whose territories were to the east of Congo, so similar in some respects to those given by De Rabruquis and others, of Prester John, as to convince him that the kingdom of that monarch might be reached by circumnavigating Africa. That this king was the king of Abyssinia, and the account substantially correct, can now scarcely be doubted; its influence on the extension of discovery by the Portuguese was most important. In 1444, Don Pedro, then Regent of Portugal, had proposed to send ambassadors to Prester John; and though at that time the intention was not prosecuted, yet it was approved by his councillors, and shows that the desires of the Portuguese had been turned in that direction. The accounts of the negroes now induced the king to send expeditions, both by sea and land. Pedro de Covilham, who was already well acquainted with the Arabs by residence in Africa, was sent in 1486 by the ordinary route, from Fez to Arabia, and thence proceeded to India. On his return he visited Sofala, and received there accounts of Madagascar. On his arrival at Cairo, he found that Alfonzo de Paiva, who had accompanied him so far, having directions to search for the kingdom of Prester John to the south, had been treacherously murdered; and he therefore proceeded himself to Abyssinia, having sent home to the king all the information he had been able to collect.

On his arrival in Abyssinia, although admitted to the highest offices of the state, he was detained a prisoner, and spent the rest of his life there; and Roderiquez de Lima, when sent as ambassador to that country in 1525, found him still alive. It should seem that he found means to keep up a correspondence with his own country, and there can be no doubt that his accounts confirmed the opinion which had already obtained among them, that India could be reached by the south of Africa.

In the meantime, an expedition, under Bartholomew Diaz, was despatched to prosecute discovery by sea. He having pursued the customary route along the coast until he had passed the tropic of Capricorn, then stood due south; and having lost sight of land, and being driven to the eastward by heavy gales, passed the southern point of Africa without knowing it, reached De la Goa Bay, and discovered Great Fish River; and returning, found he had accomplished the object of his voyage. He named it the Cape of Tempests, a name which the king judiciously changed for that of Good Hope.

Few navigators of that time deserve greater fame than Bartholomew Diaz, either for boldness or the success it merits and generally secures; for though he did not proceed far beyond the southern point of Africa, yet the easterly trending of the coast could have left no doubt on the mind of the navigator, or indeed of his nation, especially when compared with the accounts of Covilham, and the knowledge that the longitude of Alexandria had been reached so far to the south, that the route to India by sea had been opened. But before the Portuguese availed themselves of this knowledge, a fresh era in the history of discovery, and of the world, had commenced;—indeed, the discovery of the New World may well be considered as the commencement of Modern Geographical Science, for from that period until now nothing has remained to the navigator or traveller but to work out and develop its consequences.

5 *Columbus*.—Of Columbus himself little need be said; few names are better known to history than his, nor has the mistaken appellation given to the new world which he discovered robbed him of his due honour, or placed Amerigo Vespucci beside him in the sanctuary of the temple of Fame.

It is, however, important to remark, that Christoforo Colombo was by birth a noble, by education a scholar, by necessity, perhaps, a navigator. His magnanimity, his perseverance, his knowledge, are due to his antecedents. Yet does this in no degree detract from his merit. The accidents of life, in the providence of God, most frequently determine our position; our actions are our own, and those which changed the Genoese navigator into Christoval Colon, the Spanish grandee and admiral of the Indies, were worthy greater eminence than he enjoyed—placing the country of his adoption first among the nations of the world, and adding one of the most brilliant to the illuminated pages in which the learning and genius of the country of his birth, at that period, are enshrined.

Born in 1441, he was, in 1473, in the service of the king of Naples, and subsequently commanded a squadron of Genoese galleys. He then went to Lisbon, and found employment in making maps and globes, and may in this manner have contributed not a little to the success of the Portuguese navigators. At this period of his life he appears to have made a voyage to the north, and reached the seventy-third degree of latitude in that direction; and to have acquired a knowledge of land to the westward, beyond the limits of the maps constructed after Ptolemy. He also resided some time at the Azores, and heard there of land to the west, and of tokens of the existence of man brought by the sea from that quarter. He married the daughter of Pedro de Perestrelo, who had been governor of Puerto Santo, and thus acquired the inheritance of his experience and knowledge. We learn also that he had visited the coast of Africa, as far south as the fort El Mina. Availing himself of the proposals of Martin Behaim, and other philosophers, for the use of the astrolabe at sea, he distinguished himself in the paths of science, and prepared the way for his own future discoveries by framing rules for the calculation of longitude and latitude, and for thus ascertaining the position of a vessel at sea when out of sight of land, enabling navigators to traverse with certainty the pathless regions of the ocean—which, indeed, he himself was the first to explore.

The knowledge of an ocean to the east of Asia, acquired by Marco Polo; of another, extending far to the south and west of Africa, by the Portuguese; his own experience of a coast far to the west of Europe; would be sufficient to account for the decision to which the well-stored mind of Columbus was directed by his native genius; but there are not wanting evidences that others had, before him, arrived at the conclusion that the Western Ocean alone divided Europe from the Cathay and Zipango of the eastern travellers. From the middle of the fourteenth century, the Spanish and other maps, constructed no doubt from Italian originals, if not by Italians, had included islands in the Western Ocean. The Azores and Madeira were thus laid down many years previous to the usual date of their discovery; and in the map of Andrea Bianco, constructed in 1436, and now preserved in Venice, an island called Antilia is placed far to the west. On the globe constructed by Martin Behaim, probably towards the close of the same century, certainly previous to the discoveries of Columbus, an island of the same name also occurs, in the latitude of the tropic of Cancer; and one still larger a few degrees north of the equator, against which it is noted, 'in 585, Sir Brandran came here with his ships.' The countries of India, Cathay, and Zipango, appear further to the west; while to the north, Iceland, and some islands,—indicating, no doubt, the discoveries of the northmen,—are delineated.

*6 Discoveries of the Northmen.*—The researches of the Danish archæologists have placed beyond all doubt the discovery, not only of Greenland, but the northern parts of North America, by the Northmen: these were partially colonized before the end of the tenth century. In the seventh century, they had extended their piratical expeditions to Ireland; in the ninth, they had conquered the Hebrides, and levied tribute on the coasts of Ireland; before the tenth, they had discovered and sent colonies to Greenland; and at the commencement of the eleventh, an Iclander named Biorn, sailing to Greenland to see his father, was

driven to the south-west, where he found a beautiful country. After reaching his original destination, he returned with Lief, son of Eric the Red, the original colonizer of Greenland. Delighted with the place, they passed the winter there; and, by their estimation of the length of the shortest day, should have been in about the forty-ninth degree of north latitude. It is, however, uncertain whether they did not reach a more southern limit. The vines found by them induced them to name the country Vinland, to which the appellation 'the good' is usually given by the northern writers. But as the island of Montreal, in latitude  $46^{\circ}$ , was called by the French the Island of Bacchus for the same reason, this affords no evidence of their having been in a lower latitude. The description given of the portion of their discoveries which they called Markland, agrees well with the western coast of Newfoundland, Prince Edward's Island, and the parts of Nova Scotia, Cape Breton Island, and New Brunswick, surrounding the Gulf of St. Lawrence; while the north and east coast of Newfoundland agree with their description of the land first seen by them, which they named Helleland, and which they say was a rocky island. It does not appear that any colony was established by them; but, in 1121, Vinland was visited by Eric, bishop of Greenland, as a missionary, and a lucrative traffic in furs afterwards carried on from Greenland with the natives. These discoveries were brought to the general knowledge of the rest of the world by the two brothers Zeni, Venetians, who, in the service of a chief of the Feroe Islands, revisited those countries, and to the information given by their precursors added more, both novel and singular.

As in the case of so many of the early travellers, their accounts are distorted and obscured, by being mixed with fabulous matter; but there is no reason to doubt that they reached Newfoundland, which they termed Estotiland or Eastoutland, and Nova Scotia, which they termed Drocco. These countries are placed in their map more than a thousand miles west of the Feroe Islands, which they term Friesland. One of the party who had been taken prisoner, was carried by the natives far to the south, and found there a civilized people, possessed of the precious metals, living in large cities, with temples. This account would, no doubt, be connected in the minds of the cosmographers of the fifteenth century with countries adjoining to India and Cathay; for, like Columbus himself, no one seems to have doubted that the coasts and islands of the western continent were those of eastern Asia; nor is this error in distance difficult to account for. The descriptions of Ptolemy had extended Asia, on the maps of the middle ages, far to the eastward of its proper position; the discovery of countries beyond the India known to him had, of course, brought the eastern coasts of Asia, as described by Marco Polo, still further eastward of their real longitude; and so on Behaim's globe, the east coast of 'Cipangi' is placed within seventy degrees of the Azores, and 'India extra Gangem' within ninety, instead of more than double that distance, as they really are. We cannot, therefore, wonder that Columbus, expecting first to meet with islands, should think it was possible to reach land 750 leagues beyond the Canaries, though connecting that land with India; more especially as Marco Polo had represented Zipangu to be 1500 miles distant from the main-land, and that in the Sea of China to the south there were 7440 islands; for, as he places Cochin China the same distance to the west that he does Zipangu from the main-land, the conclusion that some of these islands must stretch far to the eastward seems inevitable, and could not have escaped the sagacity of Columbus.

7 *Character of Columbus.*—These considerations justify the opinion already expressed, that the discoveries of Columbus are to be attributed as much to his knowledge as to his genius, as well as the decision of Malte-Brun, that he was more learned and less rash than his panegyrists have described him, and may serve to stimulate all generous minds to the cultivation of knowledge, as that which opens to genius the path to fame.

It should be also noted, that the same scientific spirit which animated Columbus was not absent from the breasts of many of his contemporaries.



The knowledge of the circular form of the earth seems to have been the basis of all their calculations. We know, from his own account, that it was this which induced John Cabot to seek a north-west passage to India as the shortest route from England; and there is no reason to doubt that, had the great Genoese not discovered the New World, some other of the enterprising navigators of that period would have done so. Indeed, John Cabot rediscovered Newfoundland during the second voyage of Columbus, and his son Sebastian discovered Florida the year previous to that in which Columbus reached the main-land of the Western Continent. If it be the summit of human greatness to appear a giant among dwarfs, then do these things detract from the fame of Columbus; but if it be greater to be a giant among giants—and surely there were giants in the earth in those days—then do they rather add to and increase it. It was science that led the great admiral to the west, even if the immediate incitement to follow its leading was derived from physical causes, the effects of the winds and currents of the ocean.

It is well known how Columbus first opened his project to the Portuguese king, and how that monarch failed in the endeavour to rob him of the honour which must attend its success; how, to prevent similar treachery, he made proposals at the courts of Spain and England at the same time; and how the former through the noble-mindedness of its queen, Isabella, was honoured to be instrumental to the discovery of a new world. Columbus left Portugal in 1484, and more than seven years of doubt and uncertainty were ended by the agreement made between the great navigator and the king and queen of Spain, in April, 1492. On the third of August, in the same year, with three small vessels, and at the most 120 men, his confidence in himself and God to aid him, Columbus sailed from Palos. On the 6th of September, he left the Canary Isles; and, on the 11th of October, after a voyage of thirty-five days, he chanted 'Te Deum' on the island of San Salvador. Let his biographers record his trials both before and after—his triumph on that day was a full recompence for both.

*8 Discoveries of the Spaniards.*—Columbus having further discovered Cuba, Hispaniola, the Haiti of the natives, and built the fort of La Navidad, sailed for Spain; where, after dangers which would no doubt have frustrated the purposes of his outward voyage, had they then occurred, he arrived on the 15th March, 1493. The same year he sailed on his second voyage, from Cadiz; and, in 1494, John Cabot sailed from Bristol, and rediscovered Newfoundland. From this time two parallel series of discoveries were carried on in the New World, the one the result of the voyages of Columbus, the other of those of Cabot; both those navigators owed their success to the light of science; both reasoned, as their countrymen are used to do, from abstract principles: but, in the endeavour to extend and make available the results of their discoveries, these were soon forgotten. At the present time, however, when the whole globe has been mapped out, and commerce is seeking the shortest routes and readiest channels between the different countries of the world, it is worth while to remember that these two Italian navigators, at the close of the fifteenth century, acted on their knowledge of the sphere, and calculated the effect of great circle sailing. The discoveries of the English and French to the north of the New World, must occupy a separate chapter in the history of discovery, more especially as modern discovery in the Pacific has in a great measure resulted from them.

The admiral, as Columbus now delighted to be called, soon prepared for his second voyage. Success dissipated the clouds which had obscured the prospects of his first. Instead of three small vessels which the little port of Palos had with difficulty furnished, a fleet of seventeen vessels, manned by 1500 persons full of ardent hope, left the bay of Cadiz on the 25th of September. Taking a more southerly course than in his first voyage, on the 2nd of November he discovered Dominica, passed from that island to Guadaloupe, and from thence to Hispaniola, where he arrived at the end of the same month. The fort La Navidad having been destroyed, the admiral chose another

locality, and laid the foundation of the city Isabella; and having left his brother Diego as his deputy, set sail on the 24th April, 1494, with three small caravels, to examine the coast of Cuba. Directed by the natives to the south to search for gold, he discovered the island of Jamaica; but on his return towards the coast of Cuba, becoming embarrassed among small islands, he thought, and his crew, desirous to return, gladly encouraged the error, that he had reached the main-land; he therefore returned to Hispaniola by the south of Jamaica. The factious spirit of the Spaniards soon made a voyage to Spain necessary, and his enemies found means to detain him there till the year 1498. He left Spain on his third voyage, the 30th of May, with six vessels, and taking a yet more southerly course, was rewarded by the discovery of Trinidad on the 31st July. Entering the Gulf of Paria, he discovered the river Orinoco, and working through the Dragon's Mouth between the island and the main, extended his discoveries to the island of Margarita, and sailed from thence direct for Hispaniola. Here, again, faction had been the parent of strife and dissension, nor could the presence of the admiral himself restore order; and at length an officer, Francisco Bobadilla, was sent out from Spain with provisional authority, of which he commenced the exercise by sending Columbus home in irons; and though ultimately well received by the king and queen, who at his representation recalled Bobadilla, yet was he not allowed to return himself, but Nicolas de Ovando was appointed to the government.

The return of Vasco de Gama from India, by the Cape of Good Hope, happening at this juncture, and the admiral having declared his belief that the passage westward to the Indies lay between the lands discovered by him in his second and third voyages, cupidity achieved what justice could not obtain, and Columbus was permitted to depart in search of this route. He sailed from Cadiz with four small vessels, none of which exceeded seventy tons burden, the 9th of May, 1502, and made Martinique the 15th of June. Proceeding by Hispaniola and Cuba, he reached the shores of Honduras, and from thence navigated his little squadron to the Gulf of Darien; but so unfit were the vessels for the voyage, that he was obliged to seek means of refitting, and they were only saved from foundering by being run ashore on Jamaica; and here his discoveries ended, though not his troubles. Posterity, uninfluenced by envy, has done to his memory that justice which he failed to receive from his contemporaries.

9 *Successors of Columbus.*—The great admiral was not without worthy successors. Alonzo de Ojeda, a cavalier of distinction, had accompanied him in his second voyage. In 1499, Ojeda sailed from Spain with four ships, taking with him, as one of his pilots, a Florentine navigator, Amerigo Vespucci. He explored the coasts of Venezuela, and returned to Spain. This voyage is remarkable, not only on account of its connexion with the name subsequently given to the New World, but also because Ojeda met Englishmen in the Gulf of Maracaybo. Vespucci afterwards entered the service of the king of Portugal, but soon returned to Spain, where, on the death of Columbus, in 1506, he was made chief pilot. In 1507, he published an account of his voyages, in which he claims to himself the discovery of the continent which has since borne his name.

It is, however, proved beyond doubt, by the evidence of Ojeda and other eminent navigators, taken on the trial of the suit of Don Diego Columbus against the royal fiscal, that the first visit of Vespucci was made, as narrated, with Ojeda, in 1499; indeed, it does not appear that he made any independent discoveries, and he can claim no honour on that account. Impudence often attracts the attention which modest merit fails to secure.

It appears probable that Columbus gave no name to the continent, from the persuasion that it formed part of Asia, and was in the neighbourhood of India and Cathay, confirmed in this by the character of the climate, and productions of the country—the gold and pearls which he obtained from the inhabitants.

In the same year, 1499, Vincent Yanez Pinzon, who had, with his brother,

accompanied the admiral in his first voyage, sailed from Palos in December, with four caravels, pursuing his voyage south until he lost sight of the Pole Star, on the 20th of January, 1500. He made land  $8^{\circ}$  south of the equator, and  $2^{\circ}$  north of where the Portuguese admiral, De Cabral, arrived three months later. Both took possession of the new country, in the name of their respective sovereigns. Pinzon followed the coast northward until he was rewarded by the discovery of the gigantic Marañon, from whence he steered through the Dragon's Mouth to Hispaniola, and thence to Spain, where he arrived in September.

The same year, (1500), Roderigo Bastidas, taking with him Juan de la Cosa, who had been, like Vespucci, one of the pilots of Ojeda's expeditions, sailed from Cadiz with two small vessels. He prosecuted his discoveries on the coast from the most westerly point of Ojeda to the most southerly and easterly of Columbus.

In the year 1508, Pinzon, now associated with Juan de Solis, sailed again for the south. They prosecuted their voyage  $40^{\circ}$  south of the equator, but not agreeing, returned home; and, subsequently, De Solis, who, on the death of Vespucci, had been made chief pilot, sailed again for the south in 1514. He surveyed the coast with such accuracy as the science of that time permitted, discovered the river La Plata, and having been killed by the natives, his companions returned to Spain.

10 *Era of Conquest.*—The era of discovery was now to be succeeded by the era of conquest. Spain allotted out her new dominions among those who had gained them for her, on condition of their founding colonies. In the colonization of his portion, Ojeda had been anticipated by a wealthy merchant, named Nicuesa, who fitted out an expedition from Hispaniola; it had for its pilot, De la Cosa. Nunez de Balboa and Francesco Pizarro sailed in it, and Hernando Cortez was only prevented from joining them by illness. Success did not, however, attend it, though Balboa established a small colony on the Isthmus of Darien, and making incursions into the interior, in September, 1513, discovered the Pacific Ocean. The Spanish king rewarded him by appointing Pedrarias Davila governor of Darien, who put Balboa to death four years after his discovery had proved that Columbus had in reality given a new world to Spain.

The injustice of the court of Spain to the great admiral was acknowledged, and in some sort compensated, by the investment of his son Diego with his honours and offices. This gave a fresh impulse to discovery, and in 1512, Juan Diaz de Solis discovered the river La Plata, the knowledge of which was further extended by Sebastian Cabot, in 1527, and by the colonists under Pedro de Mendoza, while Juan Ponce de Leon, sailing to the north, discovered Florida and the Bahama channel, where he noticed the north-easterly current, and thus opened a new and advantageous route to Europe. This discovery was followed up, in 1519, by Francesco Garay, then governor of Jamaica, who despatched Pineda to survey the coast. He completed the survey of the Gulf of Mexico, Hernando de Cordova having, two years before, examined the coast of Yucatan, and brought back accounts of the civilization and wealth of the inhabitants; and Juan de Grijalva, following him, had landed on the coast of Campeachy, to which he gave the name of New Spain, and he more than confirmed the accounts of Cordova. In 1520, the discovery of De Leon was extended to Cape Hatteras, by Vasquez de Aillon, who thus passed into the limits of the previous discoveries of Cabot.

The conquest of Mexico by Cortez, in 1521, and the subsequent extension of his power over Honduras, led to discoveries in that ocean which Balboa had first seen. The ambition of Cortez was not contented with these limits: the Indies, Cathay, and Zipango were the ultimate object of his desires, as they were of Columbus himself; and on the discovery of the Strait of Magellan, he determined to bring the trade of the East to Europe through the countries which he had conquered. In 1526, he despatched Alvaro de Saavedra across the Pacific, thus originating those schemes which the jealous policy of the court of Spain has reserved to be carried into execution by the

British colonists of North America at the present time, more than three centuries after. He subsequently despatched a fleet to the north-west, under Hurtado de Mendoza; but this returning unsuccessful in 1536, he took the command of another expedition himself, discovered the peninsula of California, and the Gulf, which he named the Vermilion Sea, afterwards called the Sea of Cortez. He sailed northwards as far as  $40^{\circ}$ . Cortez, who may be esteemed second only to Columbus in the greatness of his views, not only extended by his own conquests the dominions of Spain in the New World, but rendered assistance to Pizarro in the conquest of Peru; indeed, the successes of the Spaniards in South America must be mainly attributed to him. These now proceeded rapidly. On the east, Orellana had descended the Marañon, to which, from his fabulous accounts, the name Amazon was given; and Valdivia reached the  $40^{\circ}$  south latitude on the coast of Chili, and thus, in less than fifty years the Spanish discoveries in the New World had been extended over  $80^{\circ}$  of latitude, equally distributed on either side of the equator, and on both coasts of the continent.

II *Vasco de Gama*.—The discovery of the Cape of Good Hope by Bartholomew Diaz had not been followed up by the Portuguese with the spirit they had previously displayed. It was not until 1497, when Covilham, by his reports of the knowledge of the Arabs of the Indian Ocean and eastern coasts of Africa, had fully prepared the way for the passage by that route to India, that Vasco de Gama was sent to explore it. He pursued the course taken by Diaz until the coast trended northward, and thus had the honour to be the first European who had reached the Indian ocean by sea. He touched at Natal, and discovered Mozambique, just two months before Columbus set out on his third voyage. Here he found civilized communities of Moors and Mahometan Arabs, carrying on a lucrative trade with India; and from this point the opposition of the Mahometans was the most serious impediment he had to encounter. Proceeding northward, he reached Mombaz and Melinda, and from the latter port steered direct to India, arriving at Calicut in twenty-three days. He had taken, as his pilot, a native of Guzzerat, whom he found acquainted with the astrolabe, and who told him it was in common use among the Arabian navigators of those seas.

By his prudent conduct, De Gama frustrated the machinations of the Mahometans, obtained the favour of the Zamorin of Calicut, and on his return took with him an ambassador from Melinda to Portugal, where he arrived in September, 1499, rather more than two years after his departure. The success of De Gama stimulated the court of Portugal to new exertions. In the same year another expedition was fitted out, the command of which was given to Pedro Alvarez Cabral. It consisted of thirteen ships, and had on board 1200 soldiers.

The course taken by Cabral differed from that hitherto pursued by the Portuguese, and led to the discovery by him of the coast of Brazil, in  $17^{\circ}$  south latitude. Writers have differed in opinion as to the motive which induced Cabral to this course; some have attributed his discovery to necessity, some to accident, some to storms, others to the endeavour to avoid them; but it seems probable that, like Cabot, from his knowledge of the properties of a sphere he shaped his course the shortest way. It has already appeared, that the great navigators of this age depended much on their mathematical knowledge. Mercator's projection had not as yet distorted the surface of the globe, and altered the apparent relations of countries to each other. The course necessary to clear the western point of Africa would be the shortest route to Brazil; Cabral took that course, and arrived there. The claim of Portugal to this country was not disputed by Spain, and she retained possession of that which the science of her navigators had discovered for her.

In the passage of the Cape, Cabral experienced severe weather, and lost four of his ships, in one of which was Bartholomew Diaz, who thus perished in the endeavour to extend and complete his own discovery. Cabral, however, reached Calicut with six ships, established a factory there, examined the coast

of Cochin, and nearly as far south as Cape Comorin; and having taken ambassadors from the principal chiefs of that coast, returned to Portugal. In the interim Juan de Nova had been despatched with four ships to join him, and had discovered the Island of Ascension, and reaching India, engaged and defeated the fleet of the Zamorin, returning with rich cargoes. De Nova discovered St. Helena, which from that period has been a place of refreshment to those engaged in the India trade.

In the spring of 1502, De Gama, whose reception had not been most gratifying on his return from his first voyage, was placed in command of a fleet of twenty ships, and proceeding direct to Quiloa, on the east coast of Africa, he compelled the king to pay tribute to the crown of Portugal. Passing from that port to India, he discovered the Seychelles, and at the request of the Christians whom he found in Malabar, he left some ships for their protection, and returned with great treasure obtained by the defeat of the fleet of Calicut. Vincent Soarez, whom he left in command in his absence, neglecting the orders he had received, cruised off the coast of Arabia for prizes, discovered the Island of Socotra, but was ultimately lost in a monsoon.

12 *Conquests of Portuguese.*—In 1503, Francisco de Albuquerque sailed with nine ships for India. He found the king of Cochin driven from his country by the Zamorin, who had after their first visit been hostile to the Portuguese, in consequence of the bad conduct of those left by De Gama at his factory. Albuquerque restored the king of Cochin, and obtained from him permission to build a fort in his dominions. Footing having been thus obtained, the era of conquest in India commenced. Albuquerque returning to Portugal was lost, but his nephew Alfonso afterwards termed the Great by the Portuguese, arrived safely with much treasure.

From the first, discovery in Africa and Asia had been carried on by the court of Portugal as a national affair, and now, as a further step towards permanent possession and empire in the East, Francisco de Almeyda was sent out with the title of Viceroy and Governor-General of the Indies. He sailed, in 1507, with a powerful armament, reduced Mombaz, and after defeating the combined fleets of Egypt, Cambay, and Calicut, and subduing the whole coast from Diu to Cochin, he returned, and was succeeded by Alfonso de Albuquerque, who established his government at Goa, and from thence, in 1509, sent Lopez Sequiera to make discoveries in the East. Sequiera reached Malacca, and, in 1511, Albuquerque followed him, reduced that place, and sailed to Sumatra, where he established a fort; and having afterwards taken Ormuz, secured the supremacy in those seas to the Portuguese. Thus conquest and discovery proceeded hand in hand. In 1506, Tristan d'Acunha discovered the island which still bears his name. Soarez and Simon d'Andrada discovered the Maldives, and Lorenzo d'Almeyda took possession of Ceylon. In 1511, Francesco Serrano and Diego d'Abrey, under the orders of Albuquerque, reached respectively, Ternate and Amboyna. In 1521, the Portuguese took possession of the Spice Islands, built a fort at Ternate, and here Antonio de Britto met the companions of Magellaens. In 1517, Soarez had sent Andrada to open the trade with China.

13 *Magellaens, his Circumnavigation.*—The discoveries of Diaz and Columbus, De Gama and Magellaens, of Balboa and Cortez, had now brought the Spaniards and Portuguese into collision among the eastern islands of Asia.

The voyage of Magellaens was the natural result of previous discoveries, and of the antagonism of Spain and Portugal. The Portuguese had penetrated to the islands of the China Sea. Balboa had proved the discoveries of Columbus to be in a New World. Both the admiral and Cortez had aimed at reaching India by a westward route. It remained to ascertain the limits of the new continent, and whether a passage through it or round it was to be found. This Cabot had endeavoured to do towards the north, and Magellaens, more fortunate, succeeded in effecting to the south.

Fernando Magellaens had attained to some note among the Portuguese commanders in the Indian seas; but, disgusted with the treatment he received

from those in power, readily embraced offers made him by the king of Spain. The service of Spain was at this time more tempting than that of Portugal, inasmuch as it offered a better field for individual exertion; the subjects of the one being permitted to undertake expeditions on their own account, while the discoveries and conquests of the other were carried on under the direction and at the expense of the government.

14 *Pope Alexander's Division of the World; its Consequences.*—When Pope Alexander VI., in the plenitude of his vicergerency over the world, had divided the globe by a line drawn from north to south, 100 leagues westward of the Azores, and conferred all countries discovered within 180 degrees to the west upon the crown of Spain, and all within the same distance east upon that of Portugal, he laid, as ignorance commonly does when it assumes the office of arbitrator, the foundation of future disputes.

The dimensions of the world were not at that time accurately determined, Asia being supposed to extend far to the east of its just limit. The Spaniards and the Portuguese, having now occupied opposite sides of the globe, began to question how far their rights under the papal grants extended. The recent discoveries of the latter, opening the commerce not only of the Spice Islands, but of China and Japan, were regarded as of more than ordinary importance—as, indeed, the fulfilment of the main object of both nations. According to the globe of Martin Behaim, the Moluccas would fall within the limits of Spain; moreover in 1494, a convention had been held, at which the two governments agreed to remove the line 370 leagues west of the Azores. Portugal by this established, indeed, her right to Brazil, but endangered the loss of it in the islands of Eastern Asia.

Magelhaens, with the ardour of a new convert, maintained the right of Spain to the Moluccas, and undertook to conduct a fleet to them by a westerly route. He sailed with five vessels, the largest of which did not exceed 120 tons burden, and only 260 men under his command, on the 20th September, 1519, made Brazil, and proceeding south discovered a harbour, which he named St. Julian, in latitude 50°. Here he determined to winter, but a mutiny breaking out, he assassinated one, executed another, and abandoned a third of his lieutenants, and by these severe measures brought his crews to obedience. Here he met with the Patagonians, and sailing from thence in October, 1520, soon entered the strait which bears his name. In the moment of success, one of his ships deserted him, and another having been wrecked previously, he entered with only three vessels the South Sea, which, seven years before, Balboa had first seen from the mountains of Darien. He crossed the vast expanse of ocean without discovering more than two of its numerous groups of islands—it is uncertain which these were—and reached the Philippines in March, 1521, nearly four months after he left the land. Here he was well received by the king of Zebu, but engaging in the quarrels of the natives, he was killed in battle, and many of his men afterwards massacred. On his death, the Spaniards destroyed one of their ships, and with the two remaining went in search of the Moluccas. Touching at Celebes and Borneo, they arrived at Tidore, and were joyfully received by its king, who was then at war with the king of Ternate, who was supported by the Portuguese. Sailing from thence, one of the vessels, obliged to put back, was captured by the Portuguese; the last remaining one, the *Vittoria*, now commanded by Sebastian del Cano, having doubled the Cape of Good Hope, reached San Lucar on the 6th of September, 1522, having circumnavigated the globe for the first time, and been absent from that port about three years and fourteen days.

In 1525 Sebastian sailed again, in a fleet commanded by Garcia de Loyasa, from Corunna, passed the Straits of Magelhaens without accident, but, on reaching the ocean one of the vessels was detached from the squadron in a storm, and with much difficulty reached the coast of Mexico. In the passage Loyasa died, and Sebastian survived him but a few days. Now under the command of Solazor, passing the Ladrone islands, the fleet reached the

Moluccas; and here, in contest with the Portuguese, many were killed and taken prisoners, and Fernando de la Torre, with the remnant, reached Spain in 1534. From this time, discovery in the Pacific, as the Spaniards of Peru and Chili had, from their experience of its character, named the new ocean, must occupy a separate place in history.

15 *Consequences of Discovery to Science.*—The immediate consequences of the remarkable voyages of Magelhaens, and the fleet of Loyasa, were not so great as might have been expected, although that of Saavedra must be considered as a result of the former; nevertheless few have been really more important, and no country has derived more benefit from them, or availed herself of the road thus opened, more readily than England.

The consequences to science were great, though not, perhaps, so apparent. It was not necessary, indeed, that the rotundity of the earth should be thus proved; but they afforded a means of estimating, approximately, its proper size, and obtaining more accurate ideas of the true length of a degree of longitude. The difference of time consequent on the rotation of the earth was also noticed, and must have exercised much influence on the astronomical speculations of that period. In 1543, Copernicus published his system of the motions of the heavenly bodies. The discoveries of Magelhaens and del Cano may have formed the basis of his theory.

## CHAPTER II.

§ 1. Discovery in Newfoundland: John and Sebastian Cabot.—2. The French in Canada: Cartier.—3. Voyages to the North-East: Chancellor.—4. The English in the Pacific; Drake.—5. Discovery to the North-West resumed; Davis, Hudson, Baffin.—6. Junction of the two oceans: Juan de Fuca.—7. Discovery in the South Sea: the East India Companies.—8. The Buccaneers: Dampier.—9. The Hudson's Bay Company: Dobbs and Middleton.—10. Russian discovery to the North-East: Behring.

**D**ISCOVERY of Newfoundland: John and Sebastian Cabot. — The extremity of the New World had now been discovered to the south, and in this Magelhaens was much facilitated by its compact form. Those who had followed the Northmen to the west had not been less diligent or less enterprising, though less successful, the irregularity of the coast detaining them of necessity for a much longer period—nay, in connexion with the rigour of the climate towards the north, has detained them till now.

If the Spaniards and Portuguese claim the honour of southern discovery, to the English and French belongs that of extending our knowledge towards the north; but it should be remarked, that in either case the leaders were Italians,—in the one, the great Genoese, and in the other, the scarcely less eminent, though less fortunate Venetian.

The voyages of the Northmen were not followed up until a century after. This is easily accounted for by the political circumstances of the time, leading men rather to the conquest and consolidation of kingdoms already known, than to the discovery of new worlds abroad; nor would it, in all probability, have been then attempted, but for the hope of arriving at Cathay by a shorter route, and thus securing a monopoly of its commercial treasures. The words of Sebastian Cabot—'Understanding, by reason of the sphere, that if I should sail by way of the north-west, I should by a shorter track come into India'—are most worthy of constant recollection, because they show that the voyages made by him and his father were not merely consequences of the first voyage of Columbus, but the result of independent deductions from known mathematical truths.

Henry VII. had received the propositions of Bartholomew Columbus favourably, and it is not impossible that he might have ultimately closed with them.

When, therefore, John Cabot laid his plans and demonstrations before him, confirmed by the success of the great admiral in his first voyage, it is not surprising that he should have readily adopted them. John Cabot, as his real name, Giovanni Cabotto, was Englished, by birth a Venetian, had been residing in the city of Bristol, then the first maritime port of England, prior to 1475. To him and his three sons Henry granted letters patent, dated the 5th March, 'in the 11th year of our reign'—i.e. 1496—'To sail under the flag of England, and take, subdue, and occupy, as lieutenant of the king, such towns, cities, castles, and isles, as they might discover.' But the projected voyage was not only to be one of discovery, conquest, and occupation; trade was to be a principal object. The monopoly of the trade of the countries was given to the adventurers, who were to fit out five vessels at their own 'costs and charges.' The merchandise brought back was to be free from customs duty, and one-fifth of the profit was to accrue to the king. The expedition set sail early in the year 1497, and on the 24th of June land was discovered. This, as first seen, was called 'Prima Vista;' and according to the then usual custom of navigators, an island lying out from the land was named St. John's, being discovered on the feast of St. John the Baptist.

In the year following the king granted a second patent, in which the recent discovery of land and isles by 'the said John Cabotto' is recited, and in which it is expressly provided that he may act by deputy, and of course superseding the first, which was granted to him and to his sons, being given to him and in his name only. It does not, therefore, appear strange that the next voyage should have been undertaken, not by John, but by his second son, Sebastian, who had accompanied him in the first. John Cabot must, at this time, have been probably fifty years old, and having pointed out the road, future discoveries were wisely committed to the son, who, though then only twenty-three years old, had the experience of one voyage, and the benefit of his father's advice, to temper the ardour of youth. Indeed, as appears to have been the case with all the great navigators of that era, his education seems to have peculiarly fitted him for the service in which he was to engage. Born in Bristol, he had been, when very young, taken by his father to Venice, where he had the opportunity of acquiring the highest mathematical and nautical knowledge of the time. In his after life he was justly esteemed as one of the greatest navigators in the world, and it is probable his early youth was not without promises of his future greatness.

Sebastian sailed in the summer of the year 1498, and, according to Peter Martyr, with two ships and three hundred men. He directed his course so far to the North Pole, that he found continual daylight; and even in the month of July, his progress was impeded by ice. Finding the land to the north of  $56^{\circ}$  still continent, he turned to the east, and having sailed probably as far as  $76^{\circ} 30'$  north, he turned to the south, and followed the coast, which he found trending towards the west, until he reached the latitude of the Strait of Gibraltar, and thence until he had the Island of Cuba on his left in nearly the same longitude. Whatever latitude may be conceded to this account, even if with Gomara we limit it to  $38^{\circ}$ , there seems no reason to doubt that Sebastian Cabot must have sailed far down the coast of North America, and possibly anticipated the discovery of Florida by Ponce de Leon by twenty years; for he noticed the gulf stream and its westerly direction. From the number of fish which were found on these coasts, and which, on his first voyage, the natives had called Baccalhaos, he gave that name to the coast he had discovered; and to the fishery thus brought into notice must be ascribed the subsequent further knowledge and colonization of the more northern portion of it.

Sebastian returned at the close of the same year, and in the following year, 1499, probably made a third voyage, and sailed still farther south. This was the same year that Ojeda was on the coast of Guiana, and reported to have found Englishmen in the bay of Maracaybo; and though there is no evidence that they belonged to the expedition of Cabot, and we know that



others were at the same time engaged in prosecuting discovery in those seas, it should not be without notice, because it is the fate of nations which, like the northern, have for the most part left to individual enterprise what the southern have undertaken as national, that much of their labour and the knowledge consequent upon it has been left unchronicled.

2 *The French in Canada: Cartier.*—Of Sebastian Cabot we hear nothing more until 1512, when he entered the service of Spain. In the interim, Gaspar Cortereal, a noble Portuguese, fitted out two ships to prosecute discovery to the north-west, to which his father, John Vaz Costa Cortereal, had, as it is said, sailed in 1463, and discovered the land of Baccalhaos. Sailing in the year 1500, he found a country distant from Europe two thousand miles, and stretching west and north-west; and coasting it for six or seven hundred miles without reaching its termination, concluded it to be part of the main-land which had been discovered the year before. If this account may in the least be depended upon—and from its inaccuracies in date, as well as from other causes, it appears far from indisputable—the description of the inhabitants would accord with those of New England, Nova Scotia, and Newfoundland; while that of the country and climate would agree better with a more northerly latitude; and accordingly it is usually supposed that Cortereal coasted along Labrador. He reached Portugal, on his return, on the 8th October, 1501. It is said that Cortereal sailed on a second voyage, and reaching Hudson's Strait, was never afterwards heard of. There is, however, a discrepancy in the date, which is fixed at 15th May, 1501. It is scarcely possible that his first voyage should have occupied more than a year, or that he should have spent a winter on the coast. His brother Michael also perished the following year in an endeavour to recover him.

During the life of Ferdinand of Spain, Sebastian Cabot remained at his court, and in 1515 was a member of the Council of the Indies; in 1516, a voyage to the north-west, projected by him, was prevented by the death of the king, and afterwards Sebastian returned to England, and the following year sailed in an expedition fitted out by Henry VIII., under the command of Sir Thomas Pert, in which, having reached latitude  $67^{\circ} 30'$ , the unfitness of the commander for his office led to the return of the expedition. It is usually supposed that Pert and Sebastian Cabot proceeded southward to Porto Rico. It is, however, more probable that the English vessel seen there by the captain of the caravel Navarro was one of the expedition despatched from Bristol in the year 1527, by Mr. Thomas Thorne. It consisted of two vessels, one of which was lost on the coast of Newfoundland; the other, it seems probable, from the account of John Rut, who commanded it, proceeded southwards.

From the period of the discovery of Newfoundland, the value of the fisheries had attracted yearly more visitors from Europe. The French, under Denys and Aubert, made voyages there in 1506 and 1508. It was not, however, till 1524, that the French fairly entered on the field of discovery. In that year, a Florentine, Giovanni Verrazzano, sailed in command of four French vessels, coasted the continent of America from  $34^{\circ}$  to  $50^{\circ}$ , and returned the same year. Nothing further was done by them until 1534, when Jacques Cartier, at the suggestion of Philip Chabot, then Admiral of France, sailed from St. Malo in April, and having circumnavigated Newfoundland, returned to France in September. The next year, he sailed again in May, with three ships, and examined the Gulf of St. Lawrence, which he had discovered in the previous voyage, named the Bay des Chaleurs, and the Peninsula of Gaspé, and passing the Island of Anticosti, he entered the River St. Lawrence, giving to the northern channel between that island and Labrador the name since extended to the whole river and the gulf into which it flows. He ascended the river as far as the island now called Montreal, to the hill in the centre of which Cartier had given the name Mont Royale. Here he found the Indian town Hochelaga. Returning to France, he arrived at St. Malo, July 6th, 1536.

In the year 1540, Jean François de la Roque, Lord of Roberval in Picardy, sailed in command of a fleet, as viceroy of the French monarch in his newly-discovered kingdom. Cartier had been sent to prepare for his reception, and proceeding past Hochelaga, built two forts; but finding the Indians, before so friendly, now violently hostile, in consequence of the death of their chief, whom Cartier had in his second voyage carried to France, he sailed down the river, and met the viceroy on the coast of Newfoundland; but, notwithstanding his arrival, returned to France, and died shortly after. Roberval explored the River Saguenay, which Cartier had discovered, and returned also to France. In the year 1549, he, in conjunction with his brother, fitted out another expedition, of which the fate has never been ascertained. These voyages, however unsuccessful, led to the knowledge that a profitable trade in furs and sea ivory might be carried on in those countries, and to their ultimate settlement by the French.

3 *Voyages to the North-East: Chancellor.*—The scientific spirit which had animated Columbus, Cabral, and Cabot, was not in England diverted from its original purpose by success. The endeavours to reach the Indies by the shortest route had led them to the discovery of the northern portions of the New World. The last voyage in that direction had, however, been made in 1536 by one Thomas Hore, of London, ‘a man of goodly stature and great courage, and given to the study of cosmography.’ This had been lamentably disastrous, and for a time the efforts of the English in that direction languished; but the return of Sebastian Cabot revived the spirit of discovery, and directed it into a new channel.

The shortest route from England to Cathay he knew must be by the north-east, and accordingly, having been appointed grand pilot by Edward VI., and governor of a company of merchants associated for the purposes of discovery, under his direction, a fleet of three ships, the command of which was given to Sir Hugh Willoughby, was despatched to the east in 1553. Two of these vessels were lost on the coast of Lapland, and their commander with their crews perished miserably; but the third, under the command of Richard Chancellor, pilot-major to the expedition, taking a more northerly course, arrived safely in the White Sea; and he, travelling over-land from thence to Moscow, opened those commercial relations with Russia which led to the establishment of the Muscovy Company, and which have been continued with so much advantage to both nations until now. Returning from a second expedition with an embassy from Russia, Chancellor was wrecked, and lost his life, on the coast of Scotland. In 1556, Stephen Burroughs, who had been with Chancellor, saw Nova Zembla, and subsequently, under the direction of Cabot, reached the River Pechora.

The English were followed in this direction by the Dutch. In 1594, four vessels left the Texel under the command of William Barentz. One division of this fleet, under Barentz, reached the northernmost point of Nova Zembla; the other, under Corneliz Nay, the Sea of Kara. This led to a second voyage, which was altogether unsuccessful; notwithstanding which, the merchants of Holland, stimulated to exertion, perhaps, by the offer of a large reward for the discovery of a North-East passage, again sent out Barentz, and with him Cornelius Rijp. Barentz reached Spitzbergen, and returning, was caught in the ice to the east of Nova Zembla, and being forced to winter in that island, died there.

4 *The English in the Pacific: Drake.*—It was not, however, only to the north that England was now prosecuting naval adventure; the progress of the Portuguese and Spaniards in the South Sea soon excited the enterprising spirit of her children.

In 1534, Alcazava had sought to reach Peru by the Strait of Magelhaens. Although his expedition was disastrous, yet it increased our knowledge of the south-eastern part of the New World. In 1539, Camargo followed him with scarcely better success, although he succeeded in reaching Peru. In 1557, Ladrillero surveyed the strait. In 1542, Villalobos made a settlement

on the island discovered by Magelhaens, and extended the knowledge of the ocean and some of the islands of the Pacific, to the group named by him the Philippines. He, however, failed in the object of his voyage viz. to make a settlement on those islands, was compelled to submit himself to the Portuguese, and died at Amboyna.

The discoveries of the Portuguese among the islands of the Eastern Archipelago, and their knowledge of a portion of the island since called Australia, had led to the conclusion that a great southern continent existed in that direction. One of the vessels of Villalobos, endeavouring to return to Spain by the east had touched at New Guinea, to which that name was then given, and which was supposed to form part of this southern continent. In 1564, an expedition was fitted out to establish a colony at the Philippines, and placed under the command of Miguel Lopez de Legaspi. With him was sent Andres Urdaneta, who had been with Loyasa; and when the first object of the voyage had been accomplished, and Manilla made the capital of the Spanish possessions in the Indian seas, Urdaneta endeavoured to return across the Pacific to New Spain, which hitherto no navigator had done. Acting, doubtless, on the same rules of abstract science which had guided Columbus, Cabral, and Cabot, Urdaneta steered a northerly course, and succeeded in reaching the Spanish possessions in America without difficulty, and from that time the Manilla fleet made its annual voyage across the North Pacific. At this period the discoveries of the Spaniards in the South Sea were carried on with much boldness. Juan Fernandez, seeking a course from north to south along the coast of Peru, steered westward, and discovered the island which still bears his name; he also ascertained the regular direction of the winds in those latitudes. He appears to have discovered other islands far to the westward, possibly New Zealand. In 1567, Alvarez de Mendana sailed from Callao, discovered the Salomon and other islands; and, on his second voyage, thirty years after, he farther discovered the Marquesas, and some minor groups, but failed to find the Salamon islands. Such were the consequences of the imperfect reckoning which, in the infancy of nautical science, navigators were able to make.

In the interim, however, a new era had opened upon the history of maritime discovery, by the appearance of the English in the Pacific. The misfortunes of Alcazava, and those who followed him, had invested the Straits of Magelhaens with terrors to the minds of the Spaniards; and though Legaspi had traversed them without difficulty, yet the success of Urdaneta had opened what seemed a more desirable route, and realized the aspirations of Cortez. But this very success was to be the cause of the danger they afterwards experienced from Drake and his followers. The voyages of the Manilla fleet had become known in Europe; already the plunder of the Spaniards in the Gulf of Mexico was looked on by the English as the easiest means of acquiring wealth, and it was believed that treasure was transported across the isthmus of Central America. To intercept this, Sir John Hawkins had, in 1567, made a voyage to the Spanish Main, and sailed as far south as the Falkland Islands, which he named after himself and his queen, Hawkins' Maiden Land; and, in 1573, Francis Drake, who had accompanied him, sailed with two ships, and, landing on the isthmus, was the first Englishman who saw the Pacific Ocean. From thence he returned with great treasure, and was followed, in 1575, by John Oxenham or Oxnam, who crossed the isthmus, built a small vessel on the opposite coast, and took two wealthy prizes from the Spaniards. He was, however, taken prisoner, and, with his men, put to death; but these two voyages, doubtless, animated the English people with the desire to extend their expeditions against the Spaniards along the western coasts of the New World.

Drake, like most of the leading English navigators of that time, was from the West of England. He was born at Tavistock, in Devonshire, and brought up to the sea. Having dissipated, in profuse liberality, the riches he had acquired in his second voyage, a fleet of five vessels was fitted out for him;

the largest of which was, however, of only 100 tons burden, and the whole only carried 164 men. He sailed on the 13th of December, 1577, from Plymouth. He reached the La Plata on the 14th of April following, and was there obliged to abandon one of his vessels. In June, he made Port St. Julian, and remained there two months; sailing from thence on August 17th, 1578, now with only three vessels, he passed through the Strait of Magellhaens, and discovered that the western portion of the land was not continuous, but an archipelago of islands. Driven by a violent gale far to the south and west, one of his vessels parted company, and was never heard of afterwards. Drake, again driven to sea by the violence of the weather, was separated from his only remaining companion, which, returning by the strait, reached England safely; he, running still further south, 'fell in with the uttermost part of the land to the South Pole,' and was the first to discover the Cape, 'without which there is no land to be seen to the south—but the Atlantic and South Sea meet in full scope.' This he places in latitude  $56^{\circ}$ , the exact position southward of Cape Horn. The Archipelago he named the Elizabethides, in honour of his queen. Proceeding northward, and amassing great treasure by the way, he reached Callao on the 15th of February; there having plundered the vessels in the harbour, and learnt that the Cacafuego, a large vessel, had recently sailed, laden with treasure to Panama, he made all sail in pursuit, and soon overtook and captured her. The booty taken was estimated at £150,000 sterling.

Having now succeeded in the main object of his voyage, Drake was anxious, as well as his men, to return home, and he determined to attempt this by the most direct route. Accordingly, having refitted, and guided, no doubt, in some measure, by charts which he had recently taken from a Spanish vessel, Drake stood directly to the north-west, and sailing 1400 leagues, without seeing land, reached the  $42^{\circ}$  north latitude. Here he found the cold intense, but proceeding still north he made land in latitude  $48^{\circ}$ ; when finding the cold increasing, and the land trending to the north-west, he renounced his intention, and turned his course to the south, passing along the coasts, already probably known to the Spaniards, of which, however, he took possession, and to which he gave the name of New Albion. From hence he determined to sail westward, and having discovered some islands, at length reached the Moluccas, and from thence, by the Cape of Good Hope, sailed to England, where he arrived, September 26th, 1580, after an absence of nearly three years.\*

It has been made a matter of dispute, how high a latitude Drake succeeded in attaining. It appears probable, that instead of reaching only  $48^{\circ}$ , he in reality sailed past that parallel, for from Vancouver's Island, in  $49^{\circ}$ , the coast very apparently trends westward. His correct observation of latitude towards the south is, indeed, the only thing that makes against this hypothesis; but in any case the easterly variation of the compass, if as great then as now, would give that impression of the direction of the land observed by him, and it is so delineated in the early Spanish charts. The true direction of the coast from Cape St. Lucas to Cape Mendocino is N.W.  $\frac{1}{2}$ -N., while that of Vancouver's Island trends N.W. by W. If Drake was wrong in his reckoning six degrees, he still must have gone as far north as Cape Mendocino, but if, as appears more likely, he reached the island afterwards named from Vancouver and Quadra, the description of the coast will appear more consonant with our present knowledge. In any case the name San Francisco may well remind Englishmen of this voyage of their great sea captain.

5. *Discovery to the North-West resumed: Davis, Hudson, Baffin.*—Martin Frobisher, the worthy comrade of Drake and Hawkins, by the support of the

\* The voyage of Magellhaens had occupied three years and thirty-seven days; that of Drake only two years and ten months.

Earl of Warwick, was enabled, in 1576, to fit out a fleet of three vessels for further discovery in the north-west. He left Yarmouth on the 19th of June, and on the 11th July made the southern point of Greenland; here one of his ships left him, and returned to England. Sailing from thence south-west, he made land in  $62^{\circ}$ , which was shut in by an impenetrable barrier of ice. This must either have been the northern coast of Labrador, or the eastern shore of Hudson's Bay, or Southampton Island; from the time taken in sailing, the latter is not improbable, and if so, Frobisher penetrated into Fox's Channel. Here he met the Esquimaux, and returning with some of these 'strange insidells,' reached home the 2nd of November.

It is probable that this discovery would not have been followed up, although he was highly commended 'for the great hope he brought of finding a passage to Cathay,' had not there been among the specimens of the productions of the new country which he brought home, a piece of black stone like coal, which probably contained pyrites, led to the belief that gold existed in that region; and, in consequence, with a 'royal ship' added to his former little squadron, Frobisher sailed again from Blackwall in May, 1577. On the 16th of July, he again entered the strait which he had discovered, loaded his vessels with 'ore,' and returned. Whether from want of knowledge or any other cause cannot now be ascertained, but the report of those who were appointed by the queen to examine the ore was favourable, as was the opinion of all men respecting the probable discovery of a north-west passage. Another expedition was therefore prepared, and in 1578, fifteen vessels, fully appointed, assembled at Harwich; in August, after having passed through the greatest dangers from the ice and fogs, and wandered to the north-westward far from their intended track, they reached the place of their destination. The losses experienced marred the prospects of the expedition, and Frobisher reluctantly returned home. It is said that he subsequently made another voyage, of which, however, no particulars are known.

In 1583, Sir Humphry Gilbert, half-brother to Sir Walter Raleigh, made three voyages to take possession of Newfoundland, of which, and other countries in America, he had obtained the gift from Queen Elizabeth. Unsuccessful in all, he in the third, after surveying some portion of the coast of that island, returning home, perished. These abortive efforts were followed by those of Sir Walter himself, of De la Roche, Chauvin and Pontgravé, and of Champlain, which led to the accurate knowledge of the entire coast from Virginia to the Gulf of St. Lawrence. This, however, belongs rather to the history of colonization than discovery.

Discovery to the north-west was resumed in 1585, when two vessels, equipped at the expense of some merchants in London, solely for that purpose, sailed from Dartmouth, under the command of John Davis, on the 7th June, and on the 19th July reached the shores of Greenland. Coasting towards the south, in the latitude  $60^{\circ}$ , he found the land trending towards the west, 'and after fifty or sixty leagues, it failed, and lay directly north.' He followed the coast for thirty leagues, and then steered north-west, and found land in  $60^{\circ} 40'$ , which he coasted for five days, and entered a strait, or sound, some twenty or thirty leagues wide, in which, sailing in open water for eighty leagues, he at length determined to return home, where he arrived on the 30th September. He subsequently made two more voyages, but without further success than tracing the outline of the land as far as Hudson's Strait. In 1602, George Weymouth was sent out, but returned without effecting anything. In 1605, the King of Denmark sent an expedition, under English commanders, Cunningham and Hall; and in 1606, the Indian merchants another, under John Knight; both were unfortunate and unsuccessful. But in 1607, Henry Hudson sailed, with only one small vessel, to find a passage, if possible, directly across the pole. He made land in latitude  $70^{\circ}$ , and still further northward, in  $73^{\circ}$ , he named a bold headland *Hold-with Hope*; this, probably, was not again seen till Scoresby's voyage in 1822. Having passed

the latitude of the north of Spitzbergen—viz.,  $81^{\circ} 30'$ , and his provisions failing, he returned home. In 1608, he set out on another voyage, which, being like the first, under the patronage of the Muscovy Company, had in their minds an Eastern direction. Hudson, however, soon gave up his attempt towards the east, and returned. He was again sent out in the service of the Dutch East India Company, and having apparently determined that if a passage was to be found, it would be to the north-west, he again abandoned the search towards the east, after reaching Wardluys. The result of this voyage was the discovery of the river which bears his name. In 1610, he was again in the service of Englishmen. Sir John Wolstenholme and Sir Dudley Digges were the chief promoters of this enterprise, in which Hudson made the discovery which has most tended to immortalize his name. He followed the track of Davis, reached the island now known as Resolution Island, and entered the strait which was destined to be called after him, where he observed the same westerly current which Davis had before noticed; from whence, proceeding westward, he entered the sea or bay since so well known by his name, and by the Company which subsequently adopted it, and which has exercised so powerful an influence over the northern parts of North America. Hudson named the capes at the entrance of the bay after his patrons, and that to the south still bears the name of Wolstenholme, as do the islands near it that of Digges. Having made this discovery, he went in search of a fitting place to winter. On the breaking up of the ice, he weighed anchor to return home; but shortly a mutiny broke out, and Hudson was set adrift with eight of his men, and left to perish.

In the course of discovery to the north-west, Hudson emulated, if he did not exceed, the services rendered by Frobisher and Davis. In 1612, Hudson was followed by Captain Thomas Button, in vessels fitted out by the same adventurers. He discovered Nelson River, and wintered there, and in the spring, having reached latitude  $65^{\circ}$ , returned home.

The subsequent voyages of Hall, Gibbons, and Fotherby, produced no results; but in 1615, the Muscovy Company sent out Robert Bylot, who took with him, as pilot, William Baffin, the fourth great name in north-western discovery. Having reached Greenland, Bylot sailed through Hudson's Strait, by Salisbury Island, into the channel afterwards called Fox's Channel, and there made land to the west, in the same latitude as Button had done. This he named Cape Comfort. He was prevented, however, from proceeding westward, by the set of the current out of Frozen Channel; but discovered the islands to the north to which Parry afterwards gave the name of Baffin, and the northern extremity of Southampton Island; from hence, at Baffin's suggestion, they returned to Nottingham Island, and from thence home, anchoring on the 8th of September in Plymouth Sound, after an absence of scarce four months.

The next year they sailed again; and the instructions given to Baffin, as pilot, by the adventurers, amount to this: That he was to enter Davis Strait, and sail as nearly as might be on the arc of a great circle to Japan. They anticipated his reaching  $80^{\circ}$  of latitude, on the west coast of Greenland. Baffin sailed on the 26th March, 1616; and after considerable difficulty, reached latitude  $77^{\circ} 35'$ , and thence followed the trending of the coast to the north-west, naming the different inlets they passed after Sir Thomas Wolstenholme, Rich, and Hackluyt, the historian of maritime discovery, Sir Thomas Smith, and Alderman Jones. Following the coast now to the south, they passed Sir James Lancaster's Sound; and, finding their farther passage obstructed by ice, returned home, where they arrived on the 30th of August. Baffin was subsequently killed in battle in the East Indies. Baffin discovered Lancaster Sound the 12th July, 1616; Parry entered it the 30th of the same month, 200 years after.

North-west discovery was continued by the Danes in 1619, and Jens Munk having sailed up Davis Strait, was forced by the ice to return, and

wintered in Chesterfield Inlet. This voyage led to no further discoveries, but is remarkable for the death of all the crew but three, the result of superstition and want of discipline.

In 1610, Luke Fox, or, as he called himself, North-west Fox, who had been longing for many years to make an attempt at discovery in that direction, sailed from Deptford in a vessel of eighty tons, provided by the king, and fully furnished at the expense of merchants of London, among whom Sir John Roe and Sir Thomas Wolstenholme were most forward; and, on the same day, Thomas James sailed from Bristol in a vessel of seventy tons, built for the purpose by the merchants of that city, and fitted out at their expense. Fox reached Hudson's Bay, and coasting Southampton Islands in latitude  $64^{\circ} 10'$ , entered the strait to which has been extended the name of Sir Thomas Roe's Welcome, which he gave to an island at the entrance; here turning to the west, he followed the coast of Hudson's Bay to Nelson River, and thence proceeding southward, on the 29th August he fell in with James; subsequently, finding the coast trending south-east, he abandoned the search, and returned home. James, less energetic, or less fortunate, only reached Port Nelson on the 16th August, in direct course from England, and proceeding southward, wintered at the bottom of the bay to which his name has been given; where, having suffered much from cold and scurvy, he was detained by the ice till the 1st of July, when, in consideration for the state of his ship and crew, he returned to England.

6 *Junction of the two oceans: Juan de Fuca.*—There is a very close connexion between the voyages of discovery made on the north-eastern coast of America and those on the north-western. The former had been undertaken with a view to the discovery of a north-western passage to India; and even in later times, Baffin's Bay and Hudson's Bay, although not satisfying this expectation, rather encouraged, by their depth and extent, the idea that a passage was to be found in that direction. The result of the voyage of Urdaneta had of course the same tendency. There was a great expanse of water to the north-east of China, and the conclusion, confirmed by experience, that the east and the west were connected by it, was soon confidently arrived at. The practicability of the passage was, of course, quite another matter; and, indeed, still remains to be ascertained. The account of Gaspar Cortereal seems to justify the conclusion that a tradition was then extant of such a connexion, and that it was named the Strait of Anian; and the endeavours of subsequent navigators, till the time of Vancouver, were directed to the finding that strait.

The idea of a junction of the two great oceans had influenced the mind of Columbus, and was not absent from that of Cortez. It led to the attempt of Drake to return home by the north-east; doubtless to the prosecution of the discoveries of the Spaniards on the north-west coast of America. The Vermilion Sea, discovered by Cortez, promised at first to realize this notion. In 1539, Juan de Ulloa sailed round it, and ascertained its limits; and Fernando Alarcon explored the Colorado River in 1540.

In 1542, Cabrillo coasted California as far as Cape Blanco and Cape Mendocino, estimating the latitude of the former at  $43^{\circ}$ , which is too far north. In 1547, Urdaneta is said to have discovered this strait. In 1584, Gali, returning from Japan, the coasts of which he had examined, described those coasts along which Drake had sailed, and is said to have first made land in  $57^{\circ} 30'$  north latitude, which, admitting an error of trifling moment, is not improbable, for he observed a current from the north, which led him to suppose that the strait in question was in that direction.

Cabrillo and Urdaneta might have preceded Drake in their voyages along this coast as far as Cape Mendocino, latitude  $42^{\circ}$  N., but Drake, in all probability, went much further north, and certainly landed, remained on the coast some time, and received the cession of it from the natives, taking formal possession. The title of the English, therefore, to it would be as good as that of the Spaniards or Portuguese to many of their possessions. It is now

in the hands of their descendants. Alarmed at the boldness of the English, the Spaniards dispatched two vessels from Lima, under Pedro de Sarmiento, in 1570, to survey the Strait of Magelhaens. He discovered the archipelago which lies on the south-west coast of South America. The reports carried by him to Spain induced the sending out a large fleet to fortify the strait, and establish a colony, the fate of which was as disastrous as its origin was foolish.

In 1604, Sebastian Viscaino examined the coast as far as Cape Mendocino, discovered the harbour of Monterey, and one vessel reaching the forty-third parallel, reported an opening, which, if seen, could only have been the mouth of the Columbia, which is, however, in latitude  $46^{\circ} 20'$ .

In the interim between the voyages of Galli and Viscaino, some discoveries are reported, which, if true, are of the first importance; and which, indeed, if only in the report, had much influence on the future.

The voyage of Drake was not likely to remain long unimitated. In 1587, Thomas Cavendish, or Candish, had followed him into the North Pacific. Near the southern point of California he captured the Santa Anna, a Spanish galleon, to which, so the story runs, he set fire, after putting the crew on shore. The vessel, however, having been driven on shore by the wind, was relifted by the Spaniards, who thus succeeded in reaching New Spain. Among them were Sebastian Viscaino and Juan de Fuca. The former is said to have made voyages on that coast in the years 1596 and 1602; and the latter to have been sent by the Viceroy of Mexico immediately after his escape. He made two voyages, and in the second, 'finding the land trending north and north-east, with a broad inlet of the sea between  $47^{\circ}$  and  $48^{\circ}$  of latitude, he entered thereinto, and sailed therein twenty days, and found that land still trending sometimes north-west and north-east and north, and also south and south-east, and very much broader sea than was at the said entrance; and passed divers islands in that sailing. Being entered thus far into the said strait, and being come into the Northern Sea already, and finding the sea wide enough everywhere, and to be about thirty or forty leagues wide at the mouth of the straits where he entered, he thought he had well discharged his office, and returned to Acapulco.'

Juan de Fuca was a Cephalonian by birth, and not receiving further encouragement from the Spaniards in the New World, returned to Europe, where he met at Venice an English merchant of note, named Lok, who endeavoured, through Sir W. Raleigh, to interest the English government in the matter, but without success; and it was not till the middle of the next century that discovery on this coast was resumed.

Of the reputed voyages of Maldonado and De Fonte, of Ladrillero and Chack, nothing need be said, but that of De Fuca appears worthy of notice. On the presumption that he passed through the straits which bear his name, through the Gulf of Georgia and Johnstone's Straits to the Pacific, his description of the Strait of Anian, which he professed to have discovered, is not altogether inaccurate.

The strait is in latitude  $48^{\circ} 30'$ . The breadth, indeed, does not exceed twenty miles, but its measurement where the Gulf of Georgia and Puget's Inlet meet may be indefinitely extended; and the number of islands and various trending of the coast are stated with sufficient accuracy. The westing made in the progress through Johnstone's Strait might, in so intricate a navigation, be easily lost sight of, especially if the variation of the compass is allowed for; and the Pacific, when re-entered, would appear to be the Northern Ocean which the Greek pilot had been seeking. But the court of Spain had its object in keeping all discovery on this coast from the knowledge of the rest of the world; and so far as it was concerned, this object was secured. The truth, however, would have been less dangerous to Spain than the uncertain accounts of De Fuca, or the fables of Maldonado and De Fonte, for those tinged the accounts of Dixon and Meares, brought Cook and Vancouver to the coast, led Alexander Mackenzie across the continent, and trans-



ferred the dominion of the north-eastern coast of the Pacific from the Spanish to the English race.

7 *Discovery in the South Sea: the East India Companies.*—The voyage of Drake is, among English navigators, without parallel until the time of Cook, in 1778. During these two centuries, however, something had been done towards discovery in the Pacific Ocean. Cavendish, who had returned by the Philippines and Moluccas and the Cape of Good Hope, and had made more accurate observations than those who preceded him, enabled geographers to lay down with greater accuracy the position of the islands of the Pacific and the coasts of Asia, by reducing the distance across the Indian Ocean, and increasing that across the Pacific. His voyage was also remarkable for its rapidity, having accomplished the circumnavigation of the globe in eight months less than Drake. His want of success in his second voyage damped the ardour for maritime discovery in England; while the political state of Europe aroused the energies of the Dutch. The union of the crowns of Spain and Portugal under the jealous Philip II. had directed the energies of those kingdoms rather to the subjugation of Europe than the extension of the trade of the world. But the emancipation of Holland brought unexpected rivals into the utmost limits of the wide-extended empire of that monarch. To this they were moved by the example of the English, and in its prosecution they made use of an English pilot. In 1598, four ships were sent, under the command of Oliver van Noort, which, passing through the Strait of Magelhaens, arrived, after a voyage of about one year and eight months, at the Ladrões, and returned by the Cape of Good Hope, reaching Rotterdam, after circumnavigating the globe in less than three years. Synchronous with this was the disastrous voyage of James Mahu, which is remarkable for the re-discovery of the Falkland Islands by Sebald de Weert on his return home, and for the residence of the pilot, William Adams, in Japan, who with one of the ships succeeded in reaching that island, where he gained the favour of the emperor; but not being permitted to depart, he obtained for the remnant of the Dutch who had landed with him the permission which was not accorded to himself; by this means the trade of Japan was opened to the Dutch and the English—for Adams was an Englishman, and in his letters had invited both to trade in his new country. The first English trader arrived at Japan in 1613; but after the death of Adams, in 1631, the trade was unaccountably discontinued, and when, afterwards, in 1673, an attempt was made to resume it, permission was refused, in consequence of the marriage of the king of England to the daughter of the king of Portugal—Adams, no doubt, having inspired the Japanese with a true protestant dread of the Portuguese and Spaniards, and the consequences of their admission into any country, and hatred of the Jesuits and priests.

The attempts to reach India by the north having failed, and the last unsuccessful voyage of Cavendish having deterred other Englishmen from following him by the Strait of Magelhaens into the Southern Ocean, in 1591 a fleet of three ships was fitted out to cruise against the Portuguese in the Indian Seas. Of these vessels one only, that commanded by James Lancaster, succeeded in reaching its destination by the Cape of Good Hope, and was subsequently lost on its return. But notwithstanding this, having obtained a charter from Queen Elizabeth, in the year 1600, some merchants of London, under the style of the 'Governor and Company of Merchant of London trading to the East Indies,' despatched Lancaster again with five ships, the following year, who returned with large profits on the adventure, having established a factory on the island of Java. He was followed by Sir Henry Middleton in 1604, and by Keeling in 1607, when amicable relations were entered into with the Great Mogul.

While the Dutch and English were thus seeking a share in the trade of the East, the French were not altogether idle. The Normans had laid claim to have been among the earliest discoverers on the coast of Africa—so early, indeed, as the middle of the fourteenth century; but with whatever

truth this may be affirmed, the eastern trade was not opened by France till the formation of the East India Company in 1604, though, in 1601, Francis Pirard de Laval had, in the endeavour, been cast away on the Maldives, from whence he did not escape till 1607; nor, indeed, was anything seriously attempted until after the re-formation of the company in 1611.

In the meantime, the colonies of New Spain recommenced the endeavour to acquire a knowledge of the South Sea, and Pedro Fernandez de Quiros, who had been with Mendana in 1595, when he attempted in vain to plant a colony on the island Santa Cruz, which he had discovered, sailed from Callao, in 1606, for this purpose. Quiros discovered several islands, and among them, probably, Otaheite; and subsequently arrived at a great country, described by the natives of the neighbouring islands as without end. Here anchoring in a spacious bay, which he named De la Vera Cruz, he supposed he had discovered the southern continent—Australia del Espiritu Santo, as he called it, and returning to Spain, obtained permission to colonize it, but died on his passage out, at Panama. Luis Vaz de Torres, his second in command, who had been separated from him in a storm, proceeded southward having ascertained 'Australia' to be an island, though what island is still uncertain. He also saw New Guinea and the islands near it, and probably discovered the great island to which the name Australia is now given.

In 1614, the Dutch again equipped a large fleet, which, under the command of George Spilbergen, sailed through the Strait of Magelhaens, defeated the Spanish on the coast of Peru, assisted in the reduction of the Spice Islands, and returned without loss in less than three years, having established the supremacy of the Dutch in those seas. Although this navigator did not increase geographical knowledge, his voyage led to the confirmation of the discovery of Drake.

The difference between discoveries carried on under the jealous system of the Portuguese, and the more liberal system of the Spaniards, has been already noticed. The contrast is even greater when made with the English and Dutch, especially after the accession of Philip II. to the united crowns of those kingdoms had assimilated the policy of both. It is also to be remarked that the genius of the Protestant religion favoured private enterprise, and thus the expeditions of the Protestant nations are marked with a boldness to which the Roman-catholic had long been strangers. The fashion, however, of forming commercial companies passed from the one to the other; and although they have seldom maintained their monopolies against the spirited attacks of individuals, yet great loss to trade and violent contests have resulted, to the great detriment, indeed, of all. A singular limitation roused the spirit of enterprise among the Dutch merchants. The charter of the Dutch East India Company gave it an exclusive right to the trade carried on through the Strait of Magelhaens. Pilots who had sailed with Cavendish could hardly have been ignorant of the discovery of Drake; and in 1615, Isaac le Maire and William Cornelisen Shouten, of Hoorn, set sail in two vessels, accompanied by two Englishmen, to double the point which Drake had discovered. Arriving at the southern part of America, they made Statenland, and, passing through the strait which separates it from Terra del Fuego, gave it the name Le Maire; and at length reaching the most southern point, they named it Horn or Hoorn, from the native town of Shouten, as well as his ship, which bore it. Having lost that vessel by fire, they were unable to prosecute further discoveries; but refreshing themselves at Juan Fernandez, they sailed for Java, where the remaining vessel, the *Unity*, was confiscated by the East India Company.

The Spaniards, alarmed at this voyage, as they had been before at that of Drake, sent Bartholomeo and Gonzalez Nodal, with Dutch pilots, to survey the southern extremity of the New World, who completed what the English and Dutch had begun.

The discovery of Torres was in the same year (1606) rivalled by the crew of a Dutch vessel, who reached Australia, but supposed that land to be part

of New Guinea. Subsequently, Dirk Hertoge gave the name of his vessel, the *Eendracht*, to the north-western portion of Australia. In 1618, Zèachen discovered the northern coast; and the year following, Jan Edels pursued his discoveries on the western. In 1627, Do Nuitz, and in the succeeding year De Witt, surveyed the southern coast, and Carpenter gave his name to Carpentaria. In 1642, Abel Jansen Tasman was sent in two ships from Batavia, to ascertain the extent of the south land. On the 24th November he discovered land, to which he gave the name of Van Diemen's Land, in honour of the governor of Batavia. Having circumnavigated Australia, Tasman sailed eastward, and discovered land, which he called Statenland, supposing it might form part of the southern continent; this was New Zealand. From thence Tasman passed to the Friendly Islands, where the conduct of the natives justified the name subsequently given them by Cook; and from thence through the Archipelago to New Guinea, and returned to Batavia. From the Dutch surveys of the coast, Australia received the name of New Holland.

8 *The Buccaneers: Dampier*.—While the Dutch and Portuguese were contending for the commerce of the east, and the French and English were colonizing North America, the riches of the Spanish Main tempted individuals, principally of these latter nations, to unite for piratical adventures, and to follow, if not in the steps of Drake, at least in those of Oxenham. By the names of *Buccaneers* or *Flibustiers*, they carried on their piracies, under different leaders; but at last, having received a severe check from the Spaniards, who surprised the island Tortuga, which they had made their home, they organized their forces and elected a commander. From this period their proceedings were on a formidable scale, and marked by unparalleled daring, prowess, and ferocity. The history of maritime discovery need not record the storming of cities or the massacre of their inhabitants; but it was the capture of Panama by Morgan, and the sight of the great expanse of the southern ocean, in 1664, that opened a new field for the ambition and rapacity of the buccaneers. In 1680, a party numbering 331, principally English, crossed the Isthmus of Darien, embarked on the South Sea in canoes, seized the first vessels they fell in with, steered to the south, and returned to the West Indies by Cape Horn.

The success of this voyage provoked another in 1683. Some of the same party, having captured a ship of eighteen guns, left the Chesapeake, and sailed for the coast of Guinea, where, having taken a Danish vessel of thirty-six guns, they burnt the first, and in their new prize sailed for the Strait of Magelhaens. Here they met another English vessel bound on the same voyage as themselves, and heard report of a third; others, therefore, there might have been, and probably were. From thence they sailed to Juan Fernandez, where, on the former voyage, they had left an Indian whom they had brought from the Mosquito coast, and whom they found again, after an absence of three years. At the Galapagos, the three vessels, having united, established a depôt; one vessel returned home by the East Indies, another by Cape Horn, while the third, after an extended cruise of several years, sank, worn out, at her anchors. These voyages added little, indeed, to geographical knowledge, but they gave fresh stimulus to maritime enterprise, and Davis and Dampier acquired in them their knowledge of the South Seas, which they carried to England; and in 1699, the latter, now in command of a vessel belonging to the royal navy, was sent by King William to examine the coasts of New Holland and New Guinea. Dampier reached the former island after a voyage of six months, and after getting embarrassed with the Archipelago on the eastern coast, sailed for New Guinea, which he reached on New Year's Day, 1700; and after coasting that island, made land to the east, which, having circumnavigated and found separate from it, he named New Britain. On his return home, his ship was wrecked on the Island of Ascension. Subsequently, Dampier made two voyages to the Pacific on privateering expeditions; in the former of which Alexander Selkirk was left on the island of Juan Fernandez; and in the latter he was discovered there, having lived

alone on the island for four years and three months. This last voyage was eminently successful as a speculation, and led to another, in which Captain Clipperton traversed the Pacific in a boat of only ten tons burden. In 1718, and in 1739, a squadron was sent under Commodore Anson to attack the Spaniards in what they fondly deemed their own waters. The French also had followed the example of the English, and now frequently traversed the Pacific; in 1721, one of their vessels had crossed that ocean in fifty days; and in the same year, Jacob Roggweeen, with a fleet of three Dutch vessels, sailed to the Falkland Islands,—which had received that name in 1690 from an English privateer captain, but were named by Roggweeen *Belgia Austral*,—sailed through the Strait of Magelhaens, and, passing from Juan Fernandez, threaded the Archipelago of the Southern Ocean, and reached Batavia.

In all these voyages the identification of the lands seen is difficult. Each voyager, being desirous of appropriating to himself what, perhaps, others had before discovered, gave a new name to what he saw, and thus almost inextricable confusion bewilders those who attempt to follow their tracks minutely. It was reserved to later times to obtain an intimate knowledge of the Pacific; but these daring sailors opened those paths which were afterwards surveyed and delineated by the skill, courage, and science of Cook and his contemporaries.

9 *The Hudson's Bay Company: Dobbs and Middleton.*—While the Buccaneers were successfully marauding in the South Seas, the spirit of enterprise in England was seeking other spheres of action, even in the frozen north, and the attempt was made which was to result in the knowledge of the interior of the northern parts of America. On the proposition of a French Canadian, named Grosseliez, who had made a journey by land to Hudson's Bay, a company was formed for the further exploration and subsequent colonization of the country around it. At the head of this was Prince Rupert, and many noblemen and men of wealth joined in the undertaking. In 1668, Zachariah Gillam was sent to take Grosseliez out. They wintered in Rupert's River, and built a fort there, taking possession of the country, which, in honour of the Prince, was named Rupert's Land, and was granted to the company as a British colony, reserving to the adventurers the sole right of occupation and trade. The formation of this company had two important effects on the progress of discovery—at first in retarding it, and subsequently in forwarding it, especially towards the extreme north. There can be no doubt that the knowledge of the valuable furs to be obtained in these northern regions had its effect, not only on the formation of the company, but on several expeditions both before and after; indeed, we find Davis engaged in this traffic, but, like a true sailor, giving it up immediately that an opportunity was afforded for the further progress of his voyage; and it appears to have been, from the first, sufficiently profitable to prevent the desire for further discovery on the part of the company. The report, however, made by the governor of their fort at Nelson River, Mr. James Knight, that copper was to be found in great plenty to the north, induced the fitting out an expedition to discover it, which was placed under his direction, and proved most disastrous, being cast away on Marble Island, at the north-west extremity of Hudson's Bay, where all the crew perished from cold and hunger, some having prolonged a miserable existence through two years. Being so long without tidings of Knight, whom they, at first, hoped might have found the long-desired western passage, the company despatched John Scroggs to search for him, who probably passed the remnant of his crew on Marble Island, but returned without doing anything. The report, however, of the great rise of the tide in Sir Thomas Roe's Welcome, which he brought home, induced a Mr. Dobbs to solicit the company to make further efforts in that direction, to which at last it consented, and sent Christopher Middleton; who, proceeding up the Welcome, discovered Wager Inlet and Repulse Bay; and finding no further progress possible in that direction, returned. He also saw, from a high hill, the strait called Frozen Strait, communicating with Fox's Channel.

This voyage had remarkable effects on further discovery to the north-west. Dobbs, on private information afforded him, accused Middleton of having been paid by the Hudson's Bay Company to give a false account of his discoveries, or, at any rate, to mislead the public; and after much altercation, Dobbs's view of the case appears to have prevailed against Middleton's defence, for an act of Parliament was passed, offering a reward of £20,000 to the discoverers of a north-west passage; and, in 1746, William Moor and Thomas Smith were sent out. This voyage resulted only in the survey of Wager Strait.

10 *Russian Discovery to the North-East: Behring.*—So many disappointments checked the ardour for discovery in England; but, in the meantime, the knowledge of the northern coasts of Asia and America was being extended by the Russians. The Empress Catherine—almost as worthy the name Great, for the largeness of her views, as her husband Peter—followed up his projects by sending an officer of her navy, Captain Vitus Behring, overland to Okhotsk, where, having built two vessels, he sailed in 1728, examined the coast of Asia to the north-east, until, in lat.  $67^{\circ} 18'$ , finding it trended westward, he, returning, wintered at Okhotsk. The next year he sailed again, and made an ineffectual attempt to reach America. Martin Spangberg, ten years after, passed between the Kurile Islands, and reached Japan.

Behring sailed on his third voyage on the 4th of June, 1741, having passed the winter in the harbour which he named Petropaulowski, from his vessels the St. Peter and St. Paul, now the most important Russian station on that coast. Tchirikow, the second in command, having been parted from Behring, reached the American coast on the 15th July, in latitude  $56^{\circ}$ , probably on one of the islands forming the Archipelago now belonging to Russia, but two boats' crews having been massacred by the natives, he returned. Behring made land on the 18th, in latitude  $58^{\circ}$  or  $60^{\circ}$  and first discovered at a distance, which he estimated at about seventy-five English miles, a mountain, to which he gave the name of St. Elias. From thence he proceeded northward, and examined the coast till it trended southward, thus discovering the peninsula of Aliaska. Here he suffered from severe storms; and driven to the south-east, and then to the north-west, he at length reached an island, in latitude  $54^{\circ} 55'$ , about eighty miles only from Kamschatka. Here Behring died, and his companions, in the spring, built a small vessel from the wreck of the St. Peter, and returned to Kamschatka. From this voyage, so fatal to the commander, not only was important geographical knowledge obtained, but a trade in furs was opened by the Russians with North-west America, which has been continued to the present day, and on account of which they despatched expeditions in 1766 and 1768, and have established a factory at Sitka, not far from where Tchirikow first made the coast; and as, in a series of expeditions commencing 1598, the whole northern coast of Asia had become known to the Russians, the voyages of Behring and Spangberg completed that knowledge by the exploration of the straits which bear the name of the first, thus proving the separation of Asia from America; and by the second, of the Archipelago to the South of Kamschatka, connecting their discoveries with those of the Portuguese in China and Japan. The existence of a north-east passage was thus demonstrated.

Of the Russian expeditions in northern Asia a brief notice in this place will suffice. In 1598, Fedor Dzakow reached the Yenisei; in 1610 he descended that river, and reached Passina, or Piasina. In 1640, Cossacks, in the service of Russia, discovered the Lena. Between 1636 and 1640, Jellesei Busa discovered, in the interior, the rivers which flow between the Lena and the Indigirka; and Ivanow, the latter river. In 1647, two unsuccessful expeditions were made to the east of the Kolyma. In 1649, Semen Deshnew, with Fedot Alexiow, and Gerasim Ankudinow, discovered the river Anadir, and entered Behring's Strait. The two latter were wrecked, and perished miserably. In 1650, Semen Motora met Deshnew at the Anadir; and Michael Staduchin following him, passed that river, and reached the Pechena, where he perished. In 1711, Wagin

and Permakow reached Liakow Islands, since named New Siberia, and were murdered by their crews. In 1712 and 1714, Staduchin, Markow, and Kruglakow, made unsuccessful voyages; and in 1724, Fedot Amossow, after two abortive attempts, discovered the Bear Islands, off the River Kolyma.

These voyages have been continued, with scarcely any intermission, until the present time; they had, however, ceased to be discoveries, and are rather to be considered examinations and surveys of the coast line. In 1736, Shuradow and Owzyn explored the Obi and Yenisci. In 1740, Sterlagow extended the knowledge of the coast to the north-east islands; and the same year Minin sailed north from the Passina to  $75^{\circ} 15'$ . In 1735, an expedition left the Lena to explore the coast to the Obi. It was commenced by Prontchichew; continued, first by Laptew, who was wrecked, and many of his companions perished; then Tcheliniskin, who fell in with the survivors, but only reached and explored the Taimura. Laptew subsequently explored the coast from the Kolyma to the Chroma; in 1740, reached Bear Islands; and in 1741, explored the Anadir in boats. In 1735, Lassinius reached the Chiamlach, but only seven of the party survived the winter. In 1759, Eterikan reached the Liakhow Islands. In 1761, Scharalov surveyed part of the coast beyond the Kolyma; in 1763, Andrijew examined the Bear Islands, which were more particularly surveyed by Leontiew Lyssow and Puhkarew in 1767, and, in 1770, they received that name from Liakhow, who obtained the monopoly of the fossil remains found on them. In 1765, Vassili Tehitsagoff was sent to make discoveries to the north; he sailed from Archangel, and reached  $78^{\circ} 8'$ , and subsequently  $80^{\circ} 30'$ ; his further progress being stopped by the ice. In 1787 and 1791, Billings explored to the east, and, in 1808, Hedenstrom the islands to the north. In 1819, Lagaref was sent to explore Nova Zemlia, but returned unsuccessful. In 1821, Lutké followed him with no better success, but in the two following years surveyed the coast of Lapland and the western coast of Nova Zemlia, and ascertained the division of the islands so named: his fourth voyage to survey the east coast was unsuccessful. It was, however, effected in 1832 by Pachtussof, though his companion, Krotoff, was lost in the attempt. In 1820, Lieutenants Von Wrangell and Angon explored the coast eastward of the Lena, and made expeditions on the ice to the Polar Sea, completing our knowledge of the northern coasts of Asia.

The outline of the eastern and northern shores of Asia being thus ascertained, nothing remained to the general correct delineation of the outline of the surface of the continental masses of land, but the ascertaining the position and character of the northern and north-western portions of America.

### CHAPTER III.

§ 1. Discovery in the Pacific: Byron and Wallis.—2. Australia and New Zealand: Cook's first voyage.—3. The Southern continent: Cook's second voyage.—4. North-West discovery resumed: Hearne and Phipps.—5. North-East route through Behring's Strait: Cook's third voyage.—6. The French in the Pacific: Perouse and D'Entrecasteaux.—7. The fur traders on the North-West coast of America: Meares and others.—8. Survey of the North-West coast of America: Vancouver.—9. Russian voyages in the North Pacific: Krusenstern.

**D**ISCOVERY in the Pacific Ocean: Byron and Wallis.—The discoveries which, in 1568, Mendana had commenced in the Pacific, were now to be completed, and our knowledge of that vast expanse of water extended to all its divisions, the dreams of enthusiasts exploded, and misrepresentations and errors of former navigators corrected. Two causes combined to produce the desirable result—the accession of George III. to the crown of England, and the loss of Canada by the French. Nothing can more

redound to the glory of that monarch, than the ardour with which he encouraged scientific pursuits. How much our men of science owe their knowledge and position in society to his fostering care, when science was comparatively little thought of, and its professors still less, many have yet to learn. To him belongs the glory of having restored to discovery her scientific character, and to have planned and sent out expeditions without selfish or political considerations; nor was this unfelt or unresponded to, even by the nations which, during his reign, were hostile to this country, but the flag of England, on board the ships of Cook, was esteemed a neutral flag.

Discovery in the Pacific had, however, recommenced under more selfish auspices. France, having lost her province of Canada, and more especially the fisheries on the banks of Newfoundland, which had been, and which, since she has regained them, still are her principal reasons for attaching any value to her possessions in those parts, looked round for some spot where, if not beyond the reach of the arms of Great Britain, at least in comparative safety from the insignificance of the spot chosen, she might plant a colony, and carry on trade in furs and fish. No doubt in part also influenced by the then prevalent belief, so tenaciously held by many, and by Dalrymple in particular, of the existence of a southern continent, as delicious in its climate and luxurious in its productions, as the most favoured part of the New World, she selected the Falkland Islands, to which, in the uncertainty of the discovery, and their hitherto uninhabited state, she had as much claim, perhaps, as any other power; and in 1763, M. de Bougainville was sent to locate a settlement on them. This seems to have attracted the attention of England, and the following year, Commodore Byron was sent with two vessels. In his instructions, the Falkland Islands and Pepys Island, called 'his Majesty's,' thus asserting the authority of Great Britain over them, are the principal objects of his researches, and their first result was to ascertain that no such island as the latter was in existence. Byron then entered the Strait of Magelhaens, where he met the Patagonians, and sailing to the Falkland Islands, discovered Port Egmont, and took possession in the name of the king. Subsequently passing the strait, he entered the Pacific, and passing the Islands of Disappointment, so named by him as affording no shelter to shipping, reached a group of islands to which he gave the name of King George; from them, by Prince of Wales Island, and the island of Danger, he reached Tinian, and returned to England by way of Batavia.

Byron was followed, in 1766, by Captains Wallis and Cartaret. On reaching the Strait of Magelhaens, they were, however, separated, and never after joined company. Wallis sailing westward, reached the group named by Cook the Society Islands, and called Tahiti, King George the Third's Island; from thence, by Tinian and Batavia, he reached England in the following spring. Cartaret, in the meanwhile, was pursuing a more southern route across the Pacific. He saw and named Piteairn's Island, and passing near the Salomon Islands without seeing them, proceeded to New Britain, discovered the strait which separates it from the island to which he gave the name New Ireland; and having determined the position of many islands in those seas, he returned to England.

In 1767, the French having resigned their claim to the Falkland Islands to Spain, in consideration of 500,000 crowns, Bougainville was sent to effect the transfer, and having done so, proceeded on a voyage across the Pacific, and passing in the track of English navigators, reached the Cape of Good Hope only a few days after Cartaret had passed it. Bougainville named one group, probably the Terra Australis of Quiros, Les Grandes Cyclades, another Louisiade, and gave his own name to another island.

These voyages, the result of mixed motives, were not completed before that of Cook, originated in singleness of mind for the advancement of science, had commenced.

2 *Australia and New Zealand: Cook's First Voyage.*—In maritime discovery, Cook stands second only to Drake in the estimation of his country-

men, and therefore only second as following him in the order of time. Among moderns, no name in the history of discovery deserves such honourable mention. Like his great fore-runner, he began life in the coasting trade, now, since the general use of coal, more important on the north-east than on the south-west coasts of England. Volunteering into a ship-of-war, he distinguished himself so much for nautical skill, courage, and discretion at the taking of Quebec, and the subsequent transactions of the war in Canada, and laid the foundation for scientific reputation, by a survey of the coast of Newfoundland, and astronomical calculation of the longitude by observing an eclipse of the sun, that when, in pursuance of the recommendation of Halley, it was determined to send an expedition to the South Sea, to observe a transit of Venus across the sun's disk, which was expected in the year 1769, the obstinacy of Dalrymple led to Cook's being appointed to the command, and he sailed from Plymouth on the 26th August, 1768, in the *Endeavour*, well supplied with all necessaries for the voyage, and accompanied by a naturalist and an astronomer of eminence. The presence of Mr., afterwards Sir Joseph Banks, with the expedition, showed that the spirit of Raleigh and Granville was not quenched in the latter part of the eighteenth century. Cook sailed round Cape Horn, and thence direct for Tahiti, which had been fixed, on the recommendation of Captain Wallace, as the place where the astronomical object of the voyage was to be secured, if possible. Favoured by the weather, three observations of the transit were obtained, and Cook proceeded to carry out his further instructions, by examining the group to which Tahiti belongs, and to which he gave the name Society; from thence he proceeded to the south-west, passed an island, named by a Tahitian he had taken with him, Ohieteroa, and reached New Zealand in October, which he circumnavigated; and having discovered the strait which still bears his name, proceeded to Australia, examined carefully the eastern coast, discovered the strait which separates it from New Guinea, to which he gave the name of his vessel, the *Endeavour*, and thence sailing to Batavia to refit, suffered the loss of his principal coadjutors and many of his crew, but reached England on the 10th June, 1771, after a voyage of two years and eleven months.

While Cook was occupied in this voyage, an expedition was fitted out by some French mercantile adventurers in Bombay, to trade with Peru, and placed under the command of M. de Surville. Having touched at the Bashee Isles, and passed the southern extremity of the Archipelago Louisiade of Bougainville, to which he gave, from the ferocity of the inhabitants, the name *Arsacides*, he reached New Zealand at the time Cook was examining that island. Here he destroyed some villages, in revenge for the loss of a boat, and to this atrocity may probably be traced the subsequent murders committed by the inhabitants on the European visitors.

3 *The Southern Continent: Cook's Second Voyage.*—The entire success of Cook's first voyage fully justified his selection to command another expedition. His discoveries on the coast of Australia and New Zealand had proved that the great southern continent, if it existed at all, was not to be found in that direction; and although, like the happy islands of the west, it seemed to fade away at the approach of man, still there were many, who, like Dalrymple, retained their faith in it to the last. The first object of Cook's second voyage was therefore to examine the southern ocean in high latitudes. Two vessels were selected of considerable tonnage; and as the only misfortune attendant on the first voyage had been the loss of men from sickness, every care was taken to prevent this in the second.

Cook sailed from Plymouth, July 13, 1772, and having crossed the meridian of Cape Circumcision, said to have been discovered by the French far to the south of the latitude assigned to it, and having thus still further reduced the dimensions of the great southern land, he proceeded to the south and east, and reached the ice on the 10th December. At first only islands and bergs were seen; but on the 17th January, in latitude  $67^{\circ} 15'$ , ice appeared, extending in a solid mass from east to south-west. Here his consort, with Captain



Furneaux, parted company in a fog, and Cook determined to repair at once to the appointed rendezvous in New Zealand, where he arrived on the 26th March, not having seen land during the whole time. In the interim, Captain Furneaux had examined the southern and eastern shores of Van Dieman's Land, and arrived at the conclusion that it formed part of Australia. This determined Cook not to make further surveys in that direction. Having hitherto preserved his own crew from disease, he determined during the winter to examine the southern Pacific within  $46^{\circ}$  of latitude, and passing the dangerous Archipelago of Bougainville, sailed to Tahiti for the benefit of Captain Furneaux's crew, who were suffering from scurvy; from thence sailing westward, he landed on the island named Middleburgh by Roggeween, and from thence proceeded to Amsterdam Island, from whence he returned to New Zealand, where having refitted his ships, he sailed on 26th November to the south. The first ice was seen on the 12th of December, and on the 30th of that month he arrived at the edge of the solid ice, in latitude  $71^{\circ}$ . Being thus stopped in his progress, Cook sailed eastward in search of the great southern land, and found the sea everywhere open, and his progress unopposed. He made Easter Island, for which his immediate predecessors had searched in vain, and from thence sailed to the Marquesas of Mendana. Proceeding from thence to Tahiti, he discovered a group to which he gave the name of *Palliser's Islands*; and having spent some time there and at *Hualheine*, returned to the group containing Amsterdam Island, to which he gave the name of the *Friendly Islands*, as descriptive of the character of their inhabitants. Sailing west, Cook fell in with a group of Islands, which he concluded to be the *Terra Australis del Spiritu Santo* of Quiros; these he found peopled with a race differing in every respect from that with which he had hitherto been acquainted in the South Seas. Cook having explored all the islands from thence to Tanna, named them the *New Hebrides*. On his voyage from them to New Zealand he further discovered *New Caledonia* and *Norfolk Island*. He reached New Zealand on the 18th October, and sailed again to the south on the 10th November, and made direct for *Terra del Fuego*, where he arrived on the 17th December; which having examined he proceeded to the east, and fell in with an island which he named *New Georgia*; and still further south he discovered land, to which he gave the name of his patron, *Earl Sandwich*. From hence he continued his voyage to the east, till on the meridian of the *Cape of Good Hope*, when he turned to the north, and arrived there on the 22nd of March, by his computation.

Cook had now circumnavigated the southern pole, and found land within  $30^{\circ}$  of latitude from it. He had arrived at the conclusion, since so fully justified, that a great mass of land did exist within that limit, but the quantity of ice, which was to him sufficient evidence of the fact, satisfied him also that the prosecution of discovery in that direction would be attended with great danger, and would be productive of no solid advantage. He left the Cape, and arrived at *Portsmouth*, 13th July, 1775, after a voyage of three years and eighteen days; and so perfect had been his arrangements for the health of his crew, that during that long period he only lost one man from sickness. Captain Furneaux had been less successful. Arriving at New Zealand after Cook left it, he lost a boat's crew, who were murdered by the natives. He sailed direct for the *Cape of Good Hope*, passing between *New Georgia* and *Sandwich Land* without discovering either, and arrived in England just one year before Cook.

In the same year in which Cook sailed on his second voyage, but some months earlier, Captain *Marion du Fresne*, incited by the success of Cook in his first voyage, proposed to take back to *Otaheite* from the *Isle of France* a native whom *Bougainville* had brought home with him. He sailed with the intention of examining the southern ocean. After having fulfilled the nominal object of his voyage, and the man having died on the passage, *Du Fresne* proceeded to New Zealand, where he and twenty-six of his companions were killed by the natives, and the expedition returned, without having effected

anything, to the Mauritius. Kerguelen, however, who had been sent with Aotorroa to that island to meet Du Fresne, proceeded from thence on a voyage of discovery to the South Atlantic, and was rewarded by the discovery of the island which bears his name, and the importance of which, as lying in the best track from the Cape of Good Hope to Australia, must before long be generally recognised. On returning to France, however, his story was doubted, but the king, Louis XV., sent him out again the next year, when he examined the coast for eighty leagues; and here, for the present, researches to the south terminated.

4 *North-West Discovery resumed: Hearne and Phipps.*—Cook had solved the great geographical problems of his day. There remained, however, one which even hitherto has not been satisfactorily expounded, and to this the attention of the English government was soon directed. Thirty years had elapsed since the contest between Middleton and Dobbs had resulted in the offer of a reward of 20,000*l.* for the discovery of a north-west passage from Europe to Asia. Incited by the Honourable Danes Barrington, Lord Sandwich, then at the head of the Admiralty, determined on sending an expedition for that purpose, and accordingly Captain Phipps, afterwards Lord Mulgrave, with Captain Lutwidge, sailed on the 4th of June, 1773, and passing Spitzbergen, reached latitude  $80^{\circ} 37'$  north; but becoming encompassed with ice, and escaping with difficulty, both ships returned to England. Two things make this expedition, otherwise unsuccessful, deserving of notice. Phipps attained the highest latitude as yet reached, and Horatio Nelson accompanied the expedition as a midshipman.

Some further progress towards north-west discovery was made by Samuel Hearne, in the employment of the Hudson's Bay Company, in the years 1769 and 1770. The object was the discovery of copper to the north; and in the last journey it was, so far as discovery was concerned, entirely successful. In 1771, Hearne traced the river to which he gave the name Coppermine, to its mouth, thus ascertaining the existence of a northern ocean,  $25^{\circ}$  to the westward of the extreme westerly point yet attained by sea. The western coast of North America was also further explored by the Spaniards, who had established settlements on the coast, as far north as San Francisco. In 1774, alarmed probably at the pertinacity of the English, and fearing lest, as subsequently happened, they might follow the example set by Drake, and seek a northerly passage round America by the west, Juan Pérez and Estevan Martinez were sent to examine the coast to the north of Cape Mendocino. They discovered land in latitude  $53^{\circ} 53'$ , probably part of Queen Charlotte's Islands, and in  $54^{\circ}$  named a headland Santa Margarita, and the strait between that and the islands, subsequently named Prince of Wales' Islands, Entrada de Perez. Want of water compelled their return south, and in  $49^{\circ} 30'$  they entered a bay called by them San Lorenzo, but since, it is thought, better known as Nootka Sound; but why the vessel should have been obliged, in such a secure haven, to cut her cables and stand to sea, seems inexplicable. Many years after, Martinez claimed the discovery of the Strait of De Fuca, and the headland at the entrance is named by the Spaniards after him.

Another expedition was despatched, in 1775, under Don Bruno Heeceta, Juan Perez d'Ayala, and Juan Francisco de la Bodega e Quadra, the latter a name subsequently well known in the history of that coast. Heeceta made land in  $48^{\circ} 26'$ , and returning observed the current of the Columbia river, but without ascertaining its real character. Bodega extended his voyage to  $56^{\circ}$  or  $58^{\circ}$ , discovered the mountain subsequently named Edgecumbe by Cook, and returned without making any discoveries worth noticing.

5 *North-East Route through Behring's Straits: Cook's Third Voyage.*—Lord Sandwich was not to be prevented from the prosecution of his great object by one failure. On consultation with the best authorities, it was determined that the next expedition should proceed by way of the Pacific Ocean and Behring's Strait, and an act of parliament was passed, by which the proffered reward was extended to success from that quarter; and Cook, although now

resting from his labours in the retirement of Greenwich Hospital, at once volunteered for the command. On the propriety of his appointment there could be no question, and he accordingly sailed on the 12th July, 1776; and when near the Cape of Good Hope, having been joined by his consort, in command of Captain Clerke, he sailed from thence on the 30th November, and passing two small islands which had been discovered by Marion du Fresne, named them after Prince Edward, and on the 24th reached Kerguelen's Land. Here he found the record left by the French of their discovery; and having ascertained its insular character, and that it did not form part of a southern continent, as Kerguelen had supposed, Cook sailed for Van Dieman's Land, where he arrived 26th January, 1777.

Depending on the correctness of Captain Furneaux's report, Cook missed the discovery of the strait between that island and Australia; touching at New Zealand, and proceeding from thence, he discovered the islands of Mangaia and Waato, outliers from the group of the Society Islands. From thence he sailed to the Friendly Islands, where he remained until he had acquired an accurate general knowledge of their geography, when, leaving them, he sailed eastward, and arrived at Otaheite in August. In December, he sailed northward, and on the 18th January discovered land, which proved to be a group of islands, to which he gave the name of Sandwich, the steady patron of geographical discovery. Here he remained about a month, and then proceeding on the main object of his voyage, reached the coast of America in latitude  $41^{\circ} 33'$ . Following the coast northwards, he named a cape, since known to be at the mouth of the Columbia River, Flattery, because it had at first seemed to hold out promise of the harbourage he was seeking; and being baffled by strong west and north-west winds, he was kept at sea, and did not again reach the land till in latitude  $49^{\circ} 29'$ ; where, between two widely separated headlands, he found the capacious sound to which he gave the name of King George, but which has retained in preference its native name of Nootka; and here his sailors commenced the traffic in furs which has, until lately, given so much commercial and political influence to the north-west coast of America.

It has been a cause of wonder to many that Cook should pass the Columbia River and the Strait of De Fuca without perceiving them. His dependence on Captain Furneaux's authority will show us that he was not unwilling to trust to the reports of others; but in the case of the narrative of De Fuca, followed as it was by the marvels of De Fonte, and unelucidated by the knowledge obtained by the Spaniards, in accordance with their usual selfish and short-sighted policy, it might have been justly matter of surprise if Cook had evinced any faith in it; but, in truth, he had no opportunity to discover the Strait of De Fuca without leaving the main object of his voyage, and returning to the south from Nootka; while the peculiar character of the mouth of the Columbia deceived not Cook only, but Vancouver; indeed, the fearful line of breakers which extends across it might well deter both from too near an approach, and lead to the conclusion that no practicable entrance for large vessels was to be found there.

Sailing from Nootka northward along the coast, he entered an extensive inlet under the 60th parallel, to which he gave the name of Prince William; and still further west, one deeper and more extensive still, to which, misapprehending its real character, the name of Cook's River was afterwards given by Lord Sandwich. Steering westward from thence, he passed between the Kodiak Islands and the main; from thence he passed to Oonalashka, where, being detained by bad weather, he gained some knowledge of that dreary country. Departing from thence, and following the coast to the north-east, he discovered Bristol River, and traced the shore of Bristol Bay, and thence followed the coast northward to latitude  $60^{\circ}$ . Here navigation became dangerous from the shallowness of the water, to avoid which, standing to sea, he discovered some islands in latitude  $60^{\circ} 17'$ , and about ten degrees of longitude to the westward; from whence, steering to the north and east, he

passed another island, to which he gave the name of Anderson, after the surgeon of the *Discovery*, who was just deceased; and again made the continent, in latitude  $64^{\circ} 27'$ . From this point he followed the coast until he reached its most westerly point, which he named Cape Prince of Wales, and perceiving land in the distance, he sailed to the westward, passed a group of islands, and reached the shores of Asia. Here he made a short acquaintance with the inhabitants, and, favoured by a southerly wind, proceeded through Behring's Strait, which he estimated as fourteen leagues in breadth at its narrowest part. Keeping the American coast in view, he steered north and east, discovered and named Point Mulgrave in latitude  $67^{\circ} 45'$ , and at last, in latitude  $70^{\circ} 44'$ , arrived at the edge of the solid ice. Had he pursued his inquiry in this quarter further, he might have possibly ascertained the existence of the islands recently discovered by Captain Kellett; but the ice appeared to Cook, and possibly was then, impassable; and he turned to the south and east, where, in latitude  $70^{\circ} 29'$ , he discovered and named Icy Cape. From thence he again turned north, and was again stopped from further progress by the ice, when he again stood in for the American land, discovered and named Cape Lisburne, in latitude  $69^{\circ} 5'$ . Finding it impossible to proceed northward, he now stood to the west, and made the coast of Asia, in latitude  $68^{\circ} 56'$ ; and finding the season too far advanced for further discovery in such high latitudes, he determined to steer southward for more temperate regions. Not, however, to leave his task more unfinished than he could help, he examined the coast of Asia until he had satisfied himself that he had reached the southern point of the promontory called by the Russians Tschutskotkoiness.

Finding his own discoveries to agree with those of Behring, but to differ from the more recently-constructed maps, especially with reference to the islands, Cook determined to satisfy himself on this head before leaving the coast, and accordingly stood over to the American shore. Here he examined and named Norton Sound, and having ascertained the continuity of the land from Cape Prince of Wales southward, was satisfied that it formed part of the American continent, and was not insular, as the charts had led him to suppose it might be. In following the coast to the southward, he found the water shoal so rapidly, that at a point, which on that occasion he named Shoal-Water, lying in latitude  $63^{\circ}$ , he was obliged to haul to the westward. Steering southward for the island which he had previously discovered under latitude  $60^{\circ}$ , he fell in with a large island, which he named after Captain Clerke, and from thence proceeded to Onalashka, to obtain water and refresh his crews. Here he received a communication from Russians engaged in the fur trade, and ascertained that since the time of Behring it had been carried on with great advantage by them; his own crews also obtained valuable furs from the natives. He also ascertained from them the incorrectness in many essential particulars of the charts in use. Cook left this coast on the 31st October, 1778; and on the 26th November, made land, which proved to be a portion of the Sandwich Island group with which he was hitherto unacquainted. He examined these islands, and in the larger, Owhyhee, discovered a harbour on the southern side. From hence, sailing to make a complete survey of the islands, his vessels were damaged in a gale, and he was obliged to put back to repair and refit. Here the natives indulged to such an extent their propensity to theft, that Cook determined to seize their king as a hostage: in this attempt he failed, and brought on a collision in which he lost his life.

With Cook commenced a new era in the art of navigation—the application of sanitary measures for the preservation of his crews, the first step made by any navigator to a satisfactory system of naval economy. Unsurpassed by any in boldness or exactitude, the extent of his discoveries is unrivalled, and the correctness of his surveys universally acknowledged. He may be well named the father of modern discovery. Before his time, the result of a voyage depended much, if not entirely, on accident; since then, the longest voyages have become almost, if not altogether, matters of calculation.

On his death Captain Clerke took the command, and proceeded northward through Behring's Strait, reached latitude  $70^{\circ} 33'$ , was there stopped by a solid barrier of ice, endeavoured to make the Asiatic shore, but failed, from the same cause, and, in consequence, determined to return home by Japan, in order to obtain information respecting those islands, so little known; but before reaching Kamschatka, he died of decline, and Captain Gore succeeded him. Under that officer and Lieutenant King, the vessels proceeded to the south-east, but from tempestuous weather, failed in the intention to survey Japan, and reached Macao on the 3rd December, 1779. Here the value of the furs they had obtained on the north-west coast of America was discovered, and led to the opening a trade in furs between India and Nootka Sound, the consequences of which were most important, both geographically and politically. Sailing from thence, they reached England on the 4th October, 1780, after an absence of four years, two months, and twenty-two days, having lost only five men from sickness during the whole period. The loss of officers in this last expedition of Cook is as remarkable as in his first, embracing the two commanders and the surgeon. The results of the voyage may be briefly summed up thus:—the establishment of the fur trade in North-west America; the placing a colony at Port Jackson, in Australia; the ultimate settlement of New Zealand; the making the Sandwich Islands the central depôt of the Pacific; and, more important than all, the education of a body of scientific navigators, inferior to none who had preceded them, whose names must appear hereafter, and who, like Vancouver, the most worthy successor of the immortal Cook, each in his degree emulated the actions and shared the fame of that great commander, who had now raised Great Britain to an eminence in the history of geographical discovery, equal to that which had been before occupied either by Portugal or Spain. This fame the French were not long in attempting to rival, and accordingly fitted out, in 1773, an expedition of two ships, which they placed under the command of François-Galaupe de la Perouse, who had already distinguished himself, no less for his courage and nautical skill than for his generosity in an expedition to destroy the English settlements on Hudson's Bay. In the selection of the officers, crews, and vessels to be employed, as well as in their supply with everything requisite for the voyage, every care was taken to meet the exigencies of an exploration more extended and more particular than any yet made.

6 *The French in the Pacific: La Perouse and d'Entrecasteaux.*—On entering the Pacific Ocean, La Perouse made Easter Island, to refresh his crews; from thence proceeding to the Sandwich Islands, he surveyed the Island of Mowee, which Cook had discovered on his return in 1778, and sailing northward, made Mount St. Elias, on the American coast, in June, 1786. From this point Cook having commenced his examination of the coast to the north, La Perouse determined to proceed to the south. In latitude  $58^{\circ} 27'$ , he established an observatory at a harbour named by him Port des François, and which he proposed should form afterwards the depôt for a French fur trade on the coast; from thence sailing southward, he reached Monterey without having made any discoveries, though from the broken outline of the coast, he conjectured what English navigators subsequently proved, the existence of the extensive archipelago and the islands by which it is guarded for nearly ten degrees of latitude. La Perouse afterwards crossed the Pacific, and though he made no discoveries, made observations of much importance in fixing the true position of many points, especially of the Ladrone and Bashee islands, and on the coast of north-east Asia and Japan. He made the coast of Tartary in June, 1787, and found it uninhabited, though beautiful, and covered with luxuriant vegetation. Here he traced the coast northward, ascertained from the natives the insular character of Shagalien, and subsequently sailed between that island and Jesso, through the strait which bears his name. Having arrived at Kamschatka, he sent his journals and charts to France overland, and then exploring the ocean under the thirty-seventh parallel, dissipated many illusory discoveries of early Spanish navigators. At the Navigators' Islands, M. de Langle, his second in

command, was, with M. Lamanon, the naturalist, killed in an affray with the natives. This appears to have made him shy in opening communications with the natives of other islands. Arriving at Australia, he found the English commencing a settlement there, and sailing thence with the intention of examining the islands to the north, was never more heard of; and it was not till 1813, that Captain Robson, trading to the Feejee Islands for sandal-wood, having transferred some Europeans from them to Queen Charlotte's Island, Captain Dillon, who had been an officer on board his ship, going, in 1826, to visit them, obtained information of the relics of French manufacture on the Island Manicolo; and having communicated this to the Indian government, was sent to make further inquiries, and ascertained beyond doubt the loss of the ships of Perouse on that island.

In 1791, however, the French sent out Admiral d'Entrecasteaux to seek for La Perouse, who examined carefully the islands lying in the track Perouse had marked out for himself; he, however, passed Manicolo, which he named *Isle de Recherche*, without examination; and dying of sickness, as well as his second in command, and disease making great ravages among his crews, to sum up the misfortunes of his voyage, his vessels were seized as prizes at Java by the Dutch government. This voyage, however unsuccessful in its main object, was most advantageous to science. Sailing near the coasts, in hopes to discover traces of La Perouse, D'Entrecasteaux was enabled to examine them more minutely than former navigators, and to fix with great accuracy the position of the more important points. The collections also made by the naturalist of the expedition, added much to the scientific knowledge of the day.

7 *The Fur Traders on the North-west coast of America: Meares and others.*—The incitements offered by the accounts of the sailors of Cook's expedition, induced English merchants, in the East as well as at home, to turn their attention to the fur trade, and almost simultaneously, in the year 1786, expeditions were despatched from London, Bombay, Calcutta, and Malacca; and the year previous, Captain Hanna had been sent on the same errand from Canton.

In London a company was formed, called the King George's Sound Company, the year after the publication of the account of Cook's voyage, and two ships were despatched under Captains Portlock and Dixon, who had both been under Cook's command; from Bombay, Captains Lawrie and Guise; and from Bengal, Captain Meares, whose consort under Captain Tipping, sailed from Malacca to meet him. Meares wintered on the coast in 1786. Portlock and Dixon spent the same period at the Sandwich Islands; while Captain Tipping and his crew were lost, probably after reaching the coast. Captains Lawrie and Guise were on the coast at the same time as La Perouse, and no doubt, from the nature of their occupations, obtained a more intimate knowledge of it than he had done. It is, however, difficult, if not impossible, to allocate with exactness their respective discoveries. Portlock certainly examined many of the inlets to the north. Dixon sailed round and named Queen Charlotte's Island, or Islands, for it is still uncertain whether it be one or more. While of two more vessels, commanded by Captains Colnett and Duncan, the latter examined and named the archipelago called Princess Royal Islands, and observed an inlet under parallel  $48^{\circ} 30'$ , which he called after De Fuca. In 1788, Meares again visited the coast, built a tender to his vessel at Nootka, and proceeded southward to examine the Strait of De Fuca, in which he sailed, he says, near thirty leagues. Captain Douglas, in the tender, threaded the channels which divide the archipelago from the main from north to south. In the same year a vessel from Boston, under Captain Grey, arrived on the coast, and having received from Meares an account of the Strait of De Fuca, entered it, and on his return published an exaggerated account of its magnitude and extent.

The trade thus opened by the English had attracted the attention of the Americans, and even the Austrian East India Company sent, in 1787, a vessel

under Captain Barclay, an Englishman; and in 1789, when a Spanish expedition arrived at Nootka, one English, two American, and one Portuguese vessels were at anchor in that harbour.

The Spaniards, who had intermitted their efforts at discovery since 1779, when an impotent attempt was made under Don Ignacio Arteaga to obtain a knowledge of the coast, had, in 1788, despatched Don Esteban José Martinez to the north, who found the Russians establishing settlements there, and moving rapidly southward. The report which he brought back, that they proposed to occupy Nootka, determined the Viceroy of Mexico to anticipate them. It is evident, from the subsequent conduct of the commander, that the rights of the English were those only which he esteemed likely to interfere with those of Spain, the Russians not having yet sent any expedition so far south, and indeed having no claim to any portion of the country south of the discoveries of Behring; but the claims which the English might base on the discoveries of Drake and Cook, and the opening of the fur trade consequent on the voyage of the latter, might prove serious; and the English company already alluded to, having purchased from the East India Company their real or supposed right of traffic on the coast, had sent vessels, not only to carry on the fur trade, but to establish a settlement at Nootka. The Spaniards, therefore, directed their hostility against the English alone, seized not only the English vessel lying in the harbour, but having allowed another to enter the harbour without notice, took possession of her also. This vessel was commanded by Captain Colnett, who had been selected to establish an English settlement there, ready for the reception of colonists, who were to arrive the year after. The Spaniards now established themselves at, and fortified Nootka; but Great Britain fitted out an armament immediately, and the Spaniards agreed to a formal surrender of Nootka. To receive this surrender, Captain Vancouver, who had been on the coast with Cook, and proved himself a most worthy disciple of that great navigator, was sent out in command of two vessels, not only for this purpose, but to extend and complete the discoveries of Cook, and ascertain accurately the existence or non-existence of any strait connecting the Pacific and the North Sea discovered by Hearne; and for this purpose, to examine every inlet of the coast which might promise such a result, from latitude 30° to 60°, especially that said to have been entered by the Washington, between parallels 48 and 49, and to correspond with the Strait of Juan de Fuca.

8 *Survey of the North-west coast of America: Vancouver.*—Vancouver, with Lieutenant Broughton for his second in command, sailed in 1791, and on his voyage out surveyed the south coast of Australia through nearly six degrees of longitude, and subsequently—having completed the survey of Dusky Bay, New Zealand, which Cook had not been able to finish—discovered the rocky and dangerous islands which he named the Swans, and a large island, which he called Oparo, one of the dangerous archipelago to the east of New Zealand; and arriving at Otaheite, he found his consort under Broughton, who had added another island to our geographical catalogues, which he named after his vessel, the Chatham. From thence he sailed to the Sandwich Islands, and having surveyed them, reached the coast of America the 18th of April, 1792; and the next day found he was in latitude 40° N. From thence he sailed northward, the wind enabling him to keep close to the coast. When off the mouth of the Columbia, the line of breakers stretching across the entrance, as well as the long-extended low land to the south, led him to think it not worth while to lose the favourable breeze he had by its exploration, and passing it, he, on the 29th, fell in with a vessel which proved to be the *Columbia*, commanded by the same Captain Gray who, in the *Washington*, had previously entered the Strait of De Fuca. He corrected the report which had been current in Europe of his discovery, limiting it to fifty miles within the strait; but his account that the natives reported it to extend to the northward, gave it its due importance in the mind of Vancouver, who accordingly proceeded to explore it, which he did, with all

its various indentations, with such minute accuracy, that the recent surveys of Captain Wilkes have added nothing of importance to our knowledge of it.

Vancouver named his discoveries after the officers of his own ships, and thus the names of Broughton, Puget, Whidbey, &c., have been handed down to posterity. In the strait separating the island in which Nootka Sound is situated from the main, he met two small Spanish vessels engaged in the survey of its coasts, and his own attention having been more particularly confined to the main by his instructions, he contented himself with the charts which they gave him, and, at their request, the united name Vancouver and Quadra was given to the island. To the inlet he gave the name Gulf of Georgia, and having sailed through the narrow strait which separates the northern extremity of the island from the main, continued a minute and painful examination of the coast to the northward, until August 17th, when, falling in with the *Venus*, of Bengal, he received from her commander an account of the arrival of a storeship, and of the murder of her commander and some of the crew at Woahoo, as well as of the wish of the Spanish commandant, Senor Quadra, to complete the transaction with the execution of which he was charged, he determined to return at once to Nootka; but being unable to agree on the terms of the surrender, and having despatched a messenger to England, he sailed southward to prosecute his inquiries; in the course of which, Broughton entered and surveyed the river Columbia, of the existence of which Gray had given information as having its outlet in the bay which Vancouver had noticed in the spring, but which river Gray had not entered, though he gave a rough sketch of the bay into which it falls. Broughton ascended the river more than 100 miles to the head of the tide-water, and named the point where his examination ended after his commander, as the Hudson's Bay Company did the fort subsequently erected by them, and now standing on that spot. Returning, he found the *Jenny*, of Bristol, detained by stress of weather, within the bay at the mouth of the river. The slow progress of the discovery of this river—the suggestion of Heceta in 1775; its confirmation by Meares in 1788; the conclusion of Vancouver, at first sight, as to the danger of entering it, in 1792; the entrance of the bay at its mouth, by Gray, the following year; and its subsequent survey by Broughton—is to be attributed to the dangerous line of breakers which cross its entrance, and leave but a very narrow channel for shipping. The number of vessels engaged, and the forwardness of the English and Americans, in the fur trade at this time, is particularly worthy of notice.

Vancouver spent the winter of 1793 at the Sandwich Islands; in the summer of that year, completed a close examination of the numerous channels which separate the islands from the main, on the north-west coast of the American continent, and the canals which stretch so deep into the land, as far as Cape Decision, in latitude 57°, when he again returned to the Sandwich Islands, and wintering there, received the cession of Owlyhee to the king of Great Britain. In the spring he was again on the American coast, and commencing his survey to the north, ascertained that Cook's River was only an inlet; and having completed the task imposed on him, he left the coast in August, and arrived in the Thames in October, after a laborious occupation during four years, in which he only lost two men, having surveyed minutely 9000 miles of coast. He, however, contracted in his labours the seeds of the disease from which he died four years after. To him we are indebted for ascertaining that no access is to be obtained from the Pacific to the North Sea, except by Behring's Strait, and he is to be esteemed the father of those laborious investigators whose surveys have, since his time, made the discoveries of the older navigators available, and who, though the results of their labours are less startling and romantic, are not less useful or worthy of record. This voyage had another important result, for Broughton, returning on a political errand, increased our knowledge of the islands and sea of Japan.

9 *Russian Voyages in the North Pacific: Krusenstern.*—The surveys of Broughton confirm and extend those of La Perouse. They differ, however,



in one important particular, the latter making Saghalien an island, while the former represents it as joined to the continent by a narrow neck of land. This difference appears to have been decided in favour of La Perouse by Captain, afterwards Admiral Krusenstern, famous in nautical history, not only as the first Russian who circumnavigated the globe, but as the accurate chronicler of the progress of discovery in the Pacific.

Broughton examined the west side, and reached latitude  $52^{\circ}$  in the Gulf of Aniwa, or channel of Tartary. Krusenstern sailed up the east coast, and doubled the northern Cape, but, baffled by the strength of the current from the river Amour, failed in his attempt to proceed southwards.

The voyage of Krusenstern, though useful to science, was totally unsuccessful in its primary intention, which was to secure to Russia a trade with Japan, an opening for which appeared to have been made by Russian agents from Tartary, who had kept up a friendly intercourse with the Japanese from 1780 until Krusenstern arrived there in 1804. In 1811, the Russian court sent Captain Golownin to complete the surveys of preceding navigators; but he was taken prisoner by the Japanese, and it was reserved for Captains Maxwell and Lyon, in command of H.M. ships *Alceste* and *Tyra*, after conveying the embassy of Lord Amherst to China—the former surveying the Gulf of Lea Tong, and the latter that of Pechele. The survey of the Yellow Sea, which was then completed, resulted in the discovery of the numerous islands to the west of the peninsula of Corea, and the consequent restoration of the coast to its proper position on the charts, from which it had been removed nearly 150 miles, probably from these islands being mistaken for it. To these important additions to geographical knowledge, these officers added that of the islands of Loo Choo. Notwithstanding the previous expeditions of Lutke, Hall, and Sarytsheff, much is wanting to complete our knowledge of these seas. This, no doubt, the expedition from the United States, now about to sail for Japan, will fully supply.

## CHAPTER IV.

§ 1. Arctic discovery resumed: Sir J. Barrow.—2. The North-West coast: Mackenzie and Kotzebue.—3. Ross and Parry.—4. Buchan and Franklin.—5. Parry and Lidden.—6. Franklin's first journey.—7. Franklin's second journey.—8. United efforts: Parry, Franklin, Beechey.—9. Discovery to the North: Scoresby and Parry.—10. The Magnetic Pole: Sir J. C. Ross.—11. Discovery on the coast: Back, Dease, and Simpson.

**A**RTIC Discovery resumed: Sir J. Barrow.—It has already been shown how discovery on the north-west coast of America was connected, especially in the case of Cook and Vancouver, with that on the east, and the object of both, the North-West passage from Europe. It remains to be seen how both were at last united. Although it has been the honour of our own day to demonstrate the barren fact that such a passage exists, how little worth the lives and treasure wasted upon it, is yet, perhaps, reserved for us to know.

2 *The North-West Coast: Mackenzie and Kotzebue.*—To the knowledge of the north-west coast of America, obtained by Cook, Vancouver, and their contemporaries, Alexander Mackenzie, by his two most enterprising and successful journeys over land, had made the important addition, that, between the mouth of the river which bears his name, in longitude  $135^{\circ} 37' W.$ , and latitude  $68^{\circ} 49' N.$ , and Bentinck's Arms, in about longitude  $128^{\circ} W.$ , latitude  $52^{\circ} N.$ , into which the Salmon river, also named after him, flows, the coast is continuous. Kotzebue, a navigator sent from Russia by private enterprise, son of a German writer of some note, had, moreover, in 1815, discovered a

secure harbour at the extreme north-west of Behring's Strait, thus offering facility for further exploration in that quarter. Before this, however, Sir John Barrow, the late secretary to the Admiralty, and chronologist of former Polar voyages, had been strenuously urging the revival of discovery to the North, and two expeditions were accordingly resolved on, the one to Davis Strait, the other direct to the North Pole.

3 *Ross and Parry*.—For the former, the *Isabella* and *Alexander* were equipped, and placed under the command of Captain John Ross and Lieutenant Edward Parry. They sailed from the Thames in April, 1818, and in June were fast to the ice off Waygat's Island. Of this voyage, perhaps, the less said the better; its results, uncertain at best, having, with one exception, been superseded by discoveries immediately subsequent; and this, which involves the integrity of Baffin's Bay, has just been resolved, and Captain Inglefield has assured us, that the land which Captain Ross saw at the head of Sir Thomas Smith's Sound, is as imaginary as that which precluded his further passage up Sir James Lancaster's Sound. It may be safely asserted, that the return of this expedition, thus unsuccessful, was not a greater disappointment to the country than to the other officers and the crews.

4 *Buchan and Franklin*.—The other expedition was not much more fortunate. The *Dorothea* and *Trent* were commissioned by Captain Buchan and Lieutenant Franklin. They also sailed in 1818, and arriving at the north-east point of Spitzbergen, from thence, proceeding northward, reached latitude  $80^{\circ} 34'$ , and being stopped by the ice, followed the edge of the bank towards the coast of Greenland; but in a storm which overtook them, the vessels were so damaged, that it was determined by Captain Buchan to forego the search, and return home—a disappointment to Franklin scarcely less than that which Parry was at the same time experiencing. It is remarkable that these officers, since the heroes of Arctic discovery, should have been seconds in command in those two most ill-managed expeditions. They were, however, soon to be rightly distinguished. The hasty decisions of Ross were too glaringly in error to be believed, and a new expedition was planned to place the truth beyond doubt.

5 *Parry and Liddon*.—The *Hecla* and the *Griper* sailed, for this purpose, in 1819, and fell in with the ice on the 18th June in Davis Strait. Parry, now a captain, commanded, and had for his second, Lieutenant Matthew Liddon. Having reached latitude  $73^{\circ}$ , by main strength and labour they worked the vessels to the entrance of Lancaster Sound, which they reached on the 31st July. Here the magic of true enterprise soon transformed land into water, a range of mountains into an open bay. Having reached latitude  $71^{\circ} 53'$ , longitude  $90^{\circ}$ , their further progress was arrested by the ice; but a broad inlet was discovered to the south, which Parry named Prince Regent's Inlet: the most distant point seen he named Cape Kater, and a harbour on the eastern shore, Port Bowen. Fortune favouring the bold, propitious showers opened a passage for the expedition, and a broad channel—that up which Franklin is now being sought—was discovered to the north, and named after the Master of the Ordnance, Wellington. Proceeding still to the west, up the strait which he had at first opened, though not discovered, it being a continuation of Lancaster Sound, and which he had named after Sir John Barrow, he reached the meridian of  $110^{\circ}$  west from Greenwich, and thus obtained for his crews the parliamentary grant of 5000*l*. Parry had now passed and named Cornwallis, Griffith, Bathurst, and Byam Martin's Islands, and reached Melville Island; here, however, his further progress was effectually stopped by a firm barrier of ice, and on the 5th of September he dropped anchor for the first time since leaving England, having, in one season, placed himself in the first rank of Arctic discoverers. On the 26th, the vessels were hauled through a canal cut in the ice into Winter Harbour, where they remained blocked up till the following August. In the spring, Parry made a journey to the west coast of the island; and when released from their long confinement, the same barrier to further progress still remaining, after sighting

a land to the south, which he named after Sir J. Banks, it was, on consultation, determined to return home. Of this voyage it is enough to say, that it is the limit even of our present knowledge to the west; and that so well did Parry combine with the skill and courage of the British seamen the care of the philanthropist, that, like those of Cook and Vancouver, his crews returned in as robust health as they set out.

6 *Franklin's First Journey*.—The longitude reached by Parry in this voyage was about that of the discovery of the Arctic Sea made by Hearne at the mouth of the Coppermine River. The probability of his reaching this point had not been overlooked by the Admiralty; and as although the actual trending of the coast was unknown from Icy Cape to Mackenzie River, and from thence to the Coppermine, its continuity was placed beyond doubt by Cook and Vancouver and Mackenzie. The most important portion, therefore, of the north coast of America to be examined was that to the east of Coppermine River, and an expedition was determined on to proceed down that river, and from thence towards the east, in the hope of meeting Parry in that direction, or at any rate ascertaining the line of coast. The command of this was conferred on Lieutenant Franklin, whose courage and constancy had often been tried in the arduous duties of his profession, and who, when second in command to Captain Buchan, had given sufficient evidence of his possession of the ardour so necessary to compensate the many difficulties and sufferings inseparable from Arctic research, and the readiness of perception, coolness, and self-confidence, without which it would be impossible to supply the defects in equipment which, in those days, want of experience made inevitable. He sailed from England in May, 1819, arrived at York Factory, the dépôt of the Hudson's Bay Company, on the east coast of America, in August, and reached Fort Chipewyan, on the Lake of the Hills, in March the following year. His companions deserve mention for various reasons: Richardson and Back, as subsequently well known in the annals of Arctic research; poor Hood, for his sad and untimely end; and Hepburn, the model of a British seaman, for his faithfulness, courage, and constancy.

During the summer of 1820, they only succeeded in reaching 550 miles to the north of Fort Chipewyan, where, building a hut, which they named Fort Enterprise, they determined to winter. From this point Back returned to Fort Chipewyan for supplies. In June, 1821, the ice was sufficiently broken in Coppermine River to allow the expedition to proceed, and on the 18th of July it reached the Arctic Sea. In two frail birch canoes, twenty persons proceeded on their voyage of discovery towards the east, with a very insufficient supply of provisions, and consequently were only able to reach a point, therefore named Turnagain, being the eastern extremity of an extensive gulf, named by Franklin, Coronation Gulf, distant six and a half degrees eastward from the mouth of the Coppermine. Obligated to return, a new route was selected, by a river falling into the gulf, which was named after Mr. Hood; and the unexpected impediments here met with, both from the nature of the country and the character of their Indian guides, made the journey back to Fort Chipewyan one of the most disastrous on record. This it is not our province to describe; it may be sufficient to say that Franklin and his companions, with the exception of the murdered Hood, were reserved for further labours and sufferings in the same cause, and reached England in safety.

7 *Parry's Second Voyage*.—The success of Parry in dispelling one illusion induced the government, immediately on his return, to commission the *Fury* and *Hecla* for further research in the Arctic regions under his command. The object of the expedition was to ascertain any connexion which might exist between the southern waters discovered by him and the Sir Thomas Rowe's Welcome of old North-west Fox. With Lieutenant Lyon as his second in command, Parry left England in May, 1821, and after much difficulty reached Southampton Island in August. As his primary object was to reach the Repulse Bay of Middleton, Parry determined to attempt doing so by Frozen Strait, which, if its existence might be depended upon, offered a direct route.

This determination was the means of dispelling another doubt which had been a serious obstruction to Arctic discovery for nearly a century. By this channel the expedition safely reached Repulse Bay, which being clear of ice, the continuity of its shores was established, and Parry proceeded on his voyage of discovery to the north; but, detained for a long time by the rapid currents running in the narrow channels between the numerous islands on this coast, he could proceed no further than a deep inlet, which he named Lyon's Inlet, and where he determined to winter. Directed and incited by a sketch map made by an Esquimaux woman named Iligliuk, whose name should not be omitted in a geographical work, in July Parry proceeded to the north, and shortly after arrived at the mouth of what by a land-journey he discovered to be a strait open to the westward, and which he named after his vessels, *Fury* and *Hecla*. Precluded from passing through, he was soon compelled to go again into winter quarters, but not before the northern shore of the strait had been reached by Lieutenant Reid and Mr. Bushnan in latitude 70° north. In the spring, however willing to resume his researches, prudence compelled Parry to return home, where he arrived safely in October, 1823.

In this voyage Parry not only named islands, bays, and headlands, as usual, after his own officers, but adopted the unusual yet most proper course of retaining native names, among which his winter quarters at Igloodik will long be remembered.

8 *United Efforts*.—The double success of Parry and the partial knowledge of the coast obtained by Franklin, now decided the government to make at the same time as many distinct efforts as there were uncertainties to be cleared up and obstacles to further progress to be removed. The *Hecla* and *Fury* were again commissioned under Parry and Lieutenant Hoppner, and this expedition was directed to Prince Regent's Inlet. Franklin, Back, and Richardson, with whom was now associated Mr. Kendall, in the place of the lost Hood, were to proceed over land to Mackenzie River, to separate at its mouth, and thence trace the coast eastward and westward; the one to meet Captain Lyon, who was, if possible, to reach Point Turnagain by the shores of Melville Island; the other to meet Captain Beechy, who was to enter the Arctic Ocean by Behring's Strait. Parry sailed in 1824, and the first season only succeeded in reaching Port Bowen; during the winter, land-journeys were made with considerable success; Lieutenant Ross saw open water to the north, and Lieutenant Sherer nearly reached Fury and Hecla Strait, to the South. These are worthy of notice as the commencement of a system by the adoption of which so much has since been achieved in Arctic discovery. In the spring, Parry attempted his passage to the south by the western shores of the inlet; but the loss of the *Fury* compelled him to return home before he had gone as far south as he had done in his first voyage.

The season appears to have been a very bad one for research on the eastern coasts, for Captain Lyon was not more successful. He had sailed in June, 1825, and reached the Welcome in August; here he encountered such heavy weather as to lead him to anticipate the necessity of abandoning his vessel, but nevertheless he succeeded in reaching Wager Inlet early in September; but losing his anchors in another violent gale, he was compelled to return home, having effected nothing in furtherance of the object of his expedition. Captain Beechy also sailed, in the *Blossom*, the same year, for Behring's Straits, where a rendezvous had been appointed with Franklin in Kotzebue's Sound, which, true to his appointment, Beechey reached on the 25th of July the following year. From hence he proceeded north; but falling in with the ice in latitude 71°, and his instructions and equipment alike forbidding his entry of the dangers of Arctic navigation, he had no alternative but to return to Kotzebue Sound. The *Blossom* barge, however, under the command of the master, Mr. Elson, succeeded in reaching a point seventy miles further east than the vessel had attained to; and so well had all the arrangements been concerted and carried out, that he was at that time within 160 miles of Franklin's party proceeding westward. This point was named after Sir John

Barrow, whose scientific knowledge had originated, and whose ardent temperament had stimulated, so many expeditions; and none could be more fitly named after him than this, as it is the most northern point of the western coast of North America, and from whence it trends rapidly to the south, towards Behring's Strait. The *Blossom* returned the following year to Kotzebue Sound, after spending the winter in the Pacific; but finding no traces of Franklin, returned home, where arriving in October, 1828, Captain Beechey found that he and his companions had arrived safely the year before.

Franklin and his party started in July, 1825, and by way of New York reached the Mackenzie River, and finally Great Bear Lake, where Back being left to prepare winter quarters, Richardson surveyed the eastern side of the lake, while Franklin proceeded to examine the mouth of the Mackenzie, from whence returning in September, he found comfortable winter quarters provided, which were named Fort Franklin. In the following June the two expeditions departed together, and reaching the mouth of the Mackenzie in July, separated on their different voyages, that under Franklin leaving Point Separation first. He succeeded in tracing the coast for 374 miles, as far as longitude  $148^{\circ} 52'$  about one-half the distance proposed, his progress having been impeded by ice and other obstacles. Richardson was more fortunate, fulfilling the intention of the expedition, tracing the coast for above 900 miles, and discovering to the north a coast, to which was given the name Wollaston Land, and of which above 100 miles were seen. Thus successful, Richardson returned by Coppermine River, and reached the Fort on the 1st September, where he was joined by Franklin on the 21st. The shores of the Arctic Ocean had thus been satisfactorily determined from Behring's Strait to Point Turnagain, through above  $50^{\circ}$  of longitude.

In these voyages Franklin discovered the Peel River, an affluent of the Mackenzie; two large rivers flowing into the Arctic Ocean, which he named after Clarence and Canning; and the point which he reached he named Return Reef. Richardson, crossing Liverpool Bay, discovered Cape Bathurst in latitude  $70^{\circ} 30'$ , crossed Franklin Bay to Cape Parry on the east, and gave the names of his boats, the *Dolphin* and the *Union*, to the strait between Wollaston land and the main.

9 *Discovery to the North: Scoresby and Parry.*—In the mean time circumstances had increased our knowledge of the sea between Greenland and Spitzbergen. Arctic researches in our own day, as in more remote times, were not to be confined to officers of the royal navy. Commerce, as it had caused those of the merchant service to take the initiative, so now it incited them to continued exertions; and among Arctic voyagers and discoverers, the name of Scoresby occupies a distinguished place. Brought up to the whale fishery, he had, in 1806, reached  $81^{\circ} 30'$  north, in a vessel under his father's command; and in 1822, when himself in command, he made the coast of Greenland in  $74^{\circ} 6'$ . As already noticed, steering southwards he discovered a large opening under latitude  $70^{\circ}$ , but the duty of following the fishery led him from the land which, after being so many years shut up in ice, he had rediscovered. The experience of Captain Scoresby has been always at the service of subsequent Arctic voyagers, although he himself has changed the rough jacket of the sailor for the gown of the minister of religion. Captain Clavering and Colonel Sabine were employed the following year to make scientific observations in Spitzbergen, and having completed them, crossed over to Greenland, the coast of which they traced as high as latitude  $76^{\circ}$ . These voyages had, no doubt, much influence on Parry's attempt to reach the Pole in that direction, and it received the sanction of Scoresby. He sailed in April, 1827, in the *Hecla*, to attempt to extend discoveries northward, across the ice, in boat sledges. Laborious travelling during one month, usually not making more progress than a few miles in a day, only brought them to latitude  $82^{\circ} 40'$ ; and the ice drifting to the southward under the influence of a northerly wind, it was found necessary to abandon the undertaking.

10 *The North Pole: Sir J. Ross.*—Government now suspended its efforts

towards northern and north-western discovery; it was not, however, entirely discontinued. His own hasty conclusion, and Parry's success, had subjected Sir J. Ross to some deserved, and to much undeserved censure. Private friendship enabled him to redeem his character at an expense of 17,000*l.*—a munificent act of generosity on the part of Mr. Booth, a due estimation of which was subsequently shown by the country in his being raised to a baronetcy. With this assistance to his own funds, Sir J. Ross commissioned a small vessel, fitted as a steamer, and named the *Victory*, and sailed from the Thames in May, 1829. He reached Fury Beach on the 13th of August, and sailing southward, commenced his discoveries at Cape Garry, and following the land reached the 70th parallel; but his further progress was stopped by a solid barrier of ice. Here he went into winter quarters, and following information obtained from the Esquimaux, his nephew, Captain J. C. Ross, traced the land both on the northern and southern shores of a broad strait, separated only by a narrow isthmus from the lower part of Regent's Inlet, and communicating with the open sea to the west, reaching the 99th meridian west longitude, or within 220 miles of the Point Turnagain of Franklin. To the land thus discovered the apparently punning name of Boothia Felix was given. Commander Ross bestowed his own name on the strait he discovered; and during the summer, before the *Victory* could be got out of her winter quarters, that active officer further signalized himself by the examination of fifty more miles of coast to the northward, and the discovery of a magnetic pole. Subsequently obliged to abandon the *Victory*, the small party under Sir J. Ross's command, almost exhausted, contrived to reach Fury Beach, after suffering the rigours of another Arctic winter. A vain attempt was made to escape towards the north, and the endurance of another winter followed. But the next year, in July, 1833, the ice, which had before blocked up Regent's Inlet, Barrow's Sound, and Lancaster Sound, and precluded all passage, had all but disappeared, and they were enabled to reach Navy Board Inlet in their boats. Here they were picked up by the *Isabella* whaler, the vessel which Sir J. Ross had formerly commanded, and arrived safely in England in October. The additions made in this expedition to geographical and meteorological knowledge were gratefully rewarded by the legislature.

11 *Discovery on the Coast: Back, Dease, and Simpson.*—The fate of Sir J. Ross and his party, while it remained uncertain, excited much anxiety at home. Stimulated by the leaders of the scientific societies in London, another expedition was decided on, and Back volunteering, was accepted as its leader. The companion of Franklin was the most fit man, without doubt, that could be selected for an expedition overland; and the Hudson's Bay Company having taken an active interest in, and contributed largely to the funds raised for it, the difficulties presented were much lessened. Captain Back, taking with him Mr. Richard King, as surgeon and naturalist, left England in February, 1833. His instructions were to proceed by New York and Montreal, and by the ordinary route of the fur traders to the Great Slave Lake, from which, or in the vicinity of which, it was believed a river took its rise, and, flowing to the north-east, would be found navigable to the Arctic Sea. Here, building two boats, he was to embark and endeavour to reach Cape Garry. It was presumed that two summers might be occupied in this, and that much knowledge of the coast might be obtained, as well as some knowledge of, if not communication with Ross; but the return of that officer enabled the government to send a despatch after Back, and thus direct him to devote all his energies to what would otherwise have been but a secondary object—viz., geographical discovery.

On reaching Slave Lake, after some difficulties, resulting from ignorance of the country, Back at length found the river to which he had been directed, the Great Fish River, since called by his name; and having made some explorations of the country, he returned to winter quarters at Slave Lake. Here he received the dispatch informing him of the safe arrival of Ross in England.

and with his mind thus relieved, he started in June, and in the end of July reached the sea, in latitude  $67^{\circ} 11'$ , longitude  $94^{\circ} 30'$ , after a tortuous course of 530 miles, having passed eighty-three rapids and many large lakes; a barrier of drift ice barred his further progress by sea; swamps and marshes on every side precluded any advance by land, and Back was obliged reluctantly to return. On reaching winter quarters, leaving Mr. King to bring up the expedition, he started express for England, where he arrived in September. In 1836, Back again braved the hardships of the Arctic regions. Under the auspices of the Royal Geographical Society, he sailed in the *Terror*, with the intention of reaching Repulse Bay, and thence making journeys over land to the west; but being caught by the ice off Cape Comfort, in September, he was held prisoner until the 10th of July following, when, with much difficulty, he succeeded in reaching England.

The same year was, however, marked with signal success on the coast, Messrs. Dease and Simpson having traced its windings from the westernmost point of Franklin to that reached by the boats of the *Blossom*; and the following year descending a river which flows from Bear Lake into the Coppermine, and which was named after Mr. Dease, they reached the shores of Coronation Gulf. By dint of incessant labour, being compelled to abandon the boats, Mr. Simpson traced 120 miles of coast, and the corresponding shores of Victoria Land to the north; but returning the following summer, and favoured by open water, on the 16th of August reached the point to which Back had attained five years before, having traced the whole line of coast between the Coppermine and Great Fish Rivers, and by the discovery of a strait, named after Mr. Simpson, ascertained the separation of Boothia Felix from the mainland towards the west. Incited by this great success, they pressed on, but were unable to get beyond longitude  $92^{\circ}$  west; on their return they surveyed more closely the shores of Victoria Land, and had the satisfaction of feeling that they had not only made the longest boat voyage then on record in Arctic regions, but of important additions to geographical knowledge. Mr. Simpson did not live long enough to reap the due reward of his labours, which were signalized by the promotion of his uncle, the governor of Hudson's Bay, to a baronetcy.

## CHAPTER V.

§ 1. Discoveries in the South Sea.—2. Colonization: Port Jackson.—3. Van Diemen's Land: Bass and Flinders.—4. Traders and missionaries.—5. The Antarctic lands: Weddell and Biscoe.—6. The surveyors: Beechey, Belcher, and Fitzroy.—7. Recent labours in the Arctic seas: Franklin and his followers.

**D**ISCOVERIES in the South Sea.—The voyages of Cook had not only opened the trade of the North-West to Europeans, but had incited them to traffic in the Southern and Central Pacific. This traffic had chances other than those of mere commercial profit to induce sailors to engage in it. The climate and productions of the country, the superiority so readily conceded by the people to Europeans, gave facilities for a luxurious life but too tempting to be refused by those whose previous existence had, in all probability, been one of long-continued hardship. This it was which seduced the crew of the *Bounty*, in 1788, to set their captain adrift in an open boat—in which he made the voyage from the Friendly Isles to Torres Strait successfully—as well as to the colonization of Pitcairn's Island; and in the many voyages which shortly after took place, the islands of the Pacific became the homes of runaway seamen, by the children of whom many are now in all probability governed. It is not a little worthy of remark, that the descendants of English sailors now inhabiting Pitcairn's Island, are among the most highly developed

of the human race, no less physically than morally. Captain Bligh had been sent in the *Bounty* to procure a stock of bread-fruit trees, for plantation in the West India Islands. To fulfil this purpose he made a second voyage in 1792; in this no addition was made to geographical knowledge, nor indeed in any of the voyages subsequent to Cook, beyond the enlarging and correcting our ideas respecting the different groups of islands in the Pacific. Captains Marshall and Gilbert had indeed named two archipelagos after their ships, the *Scarborough* and *Charlotte*, as had Lieutenant Ball in the *Supply*. Don Alessandro Malaspina had, in 1793, surveyed the coasts of Mexico. The Pelew Islands had become better known, and were opened to commerce by the wreck of the *Antelope*, in 1783; and Captains Billingshausen and Sarytschell, in the service of Russia, had made explorations among the archipelagos of the North Pacific. But the work of the discoverer was now to give place to the labours of the surveyor. In the meantime, however, that which was to confirm to Europeans the sovereignty of the Pacific had commenced—the work of Colonization had begun. The vessels of Captains Marshall and Gilbert were engaged in this service when they crossed the Pacific.

2 *Colonization: Port Jackson*.—The conquerors of the New World had, as an act of charity to the inhabitants, introduced negro slaves into it, unwitting the fearful consequences which must of necessity follow such a violation of the laws of God. The first settlers in Australia, with equally good intentions, and probably with as little anticipation of the consequences, in the formation of a penal settlement at Port Jackson, near Botany Bay, laid the foundation of that system of transportation which has been the bane of that country. Equally obnoxious in principle, the consequences of those acts are, however, very different; for the convict becoming free, may rise in the scale of humanity; the slave remaining so for ever, must degenerate. In the first case, the evil may be eradicated by time; in the last, time only confirms and increases it. It was in 1788 that Governor Philip sailed from England for this purpose; and the results have been too important, politically and socially, to be disregarded.

3 *Van Diemen's Land: Bass and Flinders*.—Colonies are proverbially the theatres of daring exploits, and this forms no exception to the rule. In 1795-6, Messrs. Bass and Flinders, of the royal navy, who had gone out with Governor Hunter, surveyed a long line of coast, in a boat only eight feet long; and in 1797, the former, now provided with a whale boat, discovered the strait which separates Van Diemen's Land from Australia, and dissipated the illusion which had been perpetuated by the misplaced confidence of Cook in his colleague's accuracy. This voyage of 600 miles, in an open boat, was followed by one in which, with Mr. Flinders, Bass circumnavigated Van Diemen's Land. Subsequently, in 1801, Mr. Flinders was employed in the *Investigator* to continue his researches on the coasts of Australia. His surveys were directed, first to the south, and afterwards to the north-west. On his outward voyage, he filled up the omissions of D'Entrecasteaux to the west; and on the south coast, in latitude  $35^{\circ} 40'$ , longitude  $138^{\circ} 58'$ , encountered the expedition of Captain Baudin, which had been sent from France on a similar errand to his own. The following year he explored the Gulf of Carpentaria and Torres Strait; and his vessel proving unfit for further service, he was proceeding to England to obtain another, when he suffered shipwreck on the barrier reefs off the eastern coast, till then unknown; and being afterwards detained at the Mauritius as a prisoner of war, his career of discovery was stopped; but its success, under more than ordinary difficulties, and with means wholly inadequate, stands out in striking contrast to the meagre results paraded with such care by the French, who, under Baudin, fully equipped, did little but give French names to places already discovered by the English; and their ludicrous alarm at finding themselves benighted on shore, shows how unworthy they were to be the followers of those who, not in the Pacific only, but in the north, had done honour to the name and service of France.

4 *Traders and Missionaries*.—The trade in sandal-wood, and the whale



fishery, as well as the supply of the wants created among the inhabitants by the visits of more civilized races, had, not long after the voyages of Cook and Vancouver, filled the Pacific with European vessels. The crews of these, not being confined within the strict limits of duty by national authority, not only introduced diseases before unknown, but frequently aided and incited the inhabitants in their wars with each other; retaliation as often followed, and thus, while the knowledge of the Pacific and its islands was daily increasing, its inhabitants were daily diminishing in numbers; and the antagonism thus generated might have been fatal to the remnant, had not Christianity followed in the traces of commerce. Both from England and America, missionaries were sent to the South Sea. The docility of the inhabitants of Otaheite singled them out, in 1799, for the scene of the earliest efforts; it was not, however, till 1817 that their success was confirmed, by the adoption of the King Pomare into the Christian Church. In 1820, missionaries arrived in the Sandwich Islands from the United States, and by 1827 they had obtained paramount authority there. While even in New Zealand, where the fiercer passions of the natives might have been supposed likely to retard their conversion, a mission, established in 1814, though for a time its efforts were frustrated, at length prevailed. The colonization of the islands followed, and now a Bishop of New Zealand prosecutes his missionary labours among the neighbouring islands. Thus the three principal stations in the Pacific have been brought under the influence of European teachers. Of these, however, New Zealand only has been preserved to England, the Sandwich Islands being now to all intents and purposes a portion, though not yet integral, of the United States, and the Society Islands a dependency of France. The fisheries and trade of the Pacific, originally opened by the enterprise and skill of Englishmen, are now fast passing into the hands of their transatlantic descendants.

5 *The Antarctic Lands: Weddell and Biscoe.*—The results of the voyages of Cook and others for the discovery of the Terra Australis have been already mentioned. These were followed up by the discovery of the South Shetland Islands by Captain W. Smith in 1819; and a further survey was made, under the direction of the admiral commanding in the Pacific, the following year. Captain Weddell fell in with the South Orkneys in 1823. In 1829, Captain Foster, in H. M. ship *Chanticleer*, made land to the south of South Shetland, of considerable extent, and mountainous; and in 1832, Captain Biscoe discovered a continuous coast of considerable extent beyond the 67th parallel of south latitude. Captain Clark, of the United States, also discovered land under the 66th parallel. These discoveries, however, have only served to verify the opinion of Cook, that there was much land about the South Pole, but too far to the south to be of any importance, except for the seal and whale fishery.

In 1839, two vessels despatched by Messrs. Enderby, of London, whose names deserve to be placed beside those of Digges, Wolstenholme, Roe, or Booth, under Captains Balleny and Freeman, discovered the islands named after the former, and subsequently continuous land named after the vessel of the latter, *Sabrina*. In 1840, Dumont d'Urville also discovered land, which he named after his wife, Terre Adélie. In 1839, the American expedition under Mr. Wilkes, also confidently reported land to the west of that discovered by d'Urville; but in the following year, 1841, this portion of the globe was freely traversed by Sir J. C. Ross, with the *Erebus* and *Terror*.

6 *The Surveyors: Beechey, Belcher, and Fitzroy.*—General knowledge, to be available for practical purposes, must be made particular; the marine surveyor must, therefore, follow close on the track of the discoverer. The early navigators, who were cosmographers in the largest sense of the word, were succeeded by those who were unable to reach, in a second voyage, the lands discovered in the first. In the South Seas accurate observations began again with Dampier. As Cook may be said to have been thus the last of the race of discoverers, Vancouver may be called the first of the surveyors. They

had worthy successors, some of whom have been already named; and as their discoveries in the Pacific were carried on in connexion with efforts after a North-West passage, so in later years and in our own time it has been likewise. The voyage in the *Blossom* has been already noticed. In addition to what Captain Beechey effected to the north, we are indebted to him for the examination and survey of the Low Archipelago, the Bay of San Francisco in California, the Loo Choo and Bonin Islands.

The voyages of the French in the Pacific were, however, unconnected with any other object than discovery and survey in it. To that of M. Freycinet, in 1819, we owe our knowledge of the Ladrone and Samoan group, and still larger results followed the two under the command of M. Dumont d'Urville—the first in 1826, in the *Astrolabe*, in which he examined the islands from New Caledonia to New Guinea, and subsequently the Caroline Islands, and the second, ten years later, in the same vessel, having now the *Zélée* for her consort, in which he visited the archipelagos of the Central Pacific. Both added much not only to our knowledge of these places, but their inhabitants, besides what was obtained in the South Shetland group, and in the Antarctic regions.

The encouragement of the whale fishery led Admiral de Petit Thouars to the Pacific the same year; and in the collection of information on this subject he visited various parts of that ocean, and had opportunities for careful scientific observation. The results were satisfactory; among others may be mentioned a chart of the Marquesas Islands. While at Honolulu in the Sandwich Islands, De Thouars met Captain Belcher in the *Blossom*. Captain Beechey had left England in 1835 in that vessel, accompanied by Lieutenant Kellett in the *Starling*, to fix such positions on the north-west coast of America as were in dispute between Cook and Vancouver; but invaliding at Valparaiso, Captain Belcher took the command at Panama. In this expedition a portion of the coasts of Mexico and California was surveyed, and the islands of Revilla Gigedo, and subsequently the principal archipelagos of the Central Pacific, *en route* to China. Previous to this, however, in 1825, Commanders King and Stokes, the latter of whom was, on his death, succeeded by Captain Fitzroy, had been sent to the south. The result of this voyage was the survey of the Atlantic coast of South America, from the La Plata to the Strait of Magelhaen. In 1831, Captain Fitzroy again commissioned his old ship, the *Beagle*, completed the survey of Terra del Fuego and the coasts of Chili and Peru northwards to Guayaquil, as well as the Galapagos Islands, and, for the first time, carried a chain of meridional distances round the globe.

Within the interval already alluded to, Van Siebold visited Japan, and has given to the world the results of his observations and experience.

The same cause which led De Thouars to the Pacific, induced the United States to send an expedition there. This, after much delay, was effected in 1838, under the command of Lieutenant Wilkes. It was at first directed to the west coast of America, which was examined from south to north as far as the Strait of Juan de Fuca, but with small results beyond confirming the accuracy of Vancouver, Beechey, and Belcher. The most important results of this expedition were, however, the survey of the Hawaiian and Feejee groups, as well as examination of the Samoan and the Union groups. In the Phoenix group, doubtful islands were surveyed, and their existence established. Ellice's group and the Kingsmill or Gilbert's Archipelago, were delineated, and an examination made of Marshall's Archipelago. Of the Antarctic cruise made by this expedition, little must be said, as its supposed results were, as has been seen, negatived by Sir J. C. Ross in his voyage with Captain Crozier, in the *Erebus* and *Terror*, in 1841-2, in which he not only discovered but explored Victoria Land. Those voyages are, moreover, within the recollection of all, and therefore require general reference only.

7 *Recent Labours in the Arctic Seas: Franklin and his Followers.*—It has

been noted that the only geographical problem of importance remaining to be solved by the maritime discoverer was the existence of a North-west passage from the Atlantic to the Pacific. This had indeed been almost effected by the labours of Sir J. C. Ross, of Dease and Simpson, following up and completing those of Franklin and Richardson; but their discoveries, as well as those of Parry, had made known the existence of extensive lands to the north of the continent of America, the character of which had not yet been fully ascertained. To have accomplished so much and failed in the completion of the work, would have been unworthy of the men themselves; still more so of the country to which they belonged. Further discovery was, therefore, immediately contemplated; and in this once more Sir J. Barrow took the lead, and his plans, as approved by Franklin, Parry, Ross, and Sabine, were adopted by the government. The *Exeetus* and *Terror* were again put in commission under the command of Sir J. Franklin and Captain Crozier, who had shown his fitness for the service when with Sir J. C. Ross in the Antarctic Ocean. These vessels were fitted with auxiliary screw propellers of power sufficient to move them, though slowly, in calms or adverse winds; and it was only under such circumstances that their use was contemplated; they were, moreover, supplied with all the sanatory and scientific *materiel* that the advanced experience of the age could suggest; and from the character of the officers and men it was fondly hoped that they would not fail to open the route by Lancaster Sound and Barrow's Strait, to the Pacific, either direct to the west of Melville Island or to the north by Wellington Channel. The distance to be achieved was only about 900 miles, and to the westward the sea was supposed to be open. On July 25th, 1845, the expedition was seen in latitude 74° 48' in Baslin's Bay, waiting the opening of the ice towards Lancaster Sound; at that time, the crews were in high health and spirits, and sanguine of achieving the object of their voyage, having plentiful stores and provisions, fuel and other necessaries, for three years, besides five bullocks. Time, however, passed away, and no further tidings of the adventurers were received. In 1846, Dr. Rae, in the service of the Hudson's Bay Company, left Fort Churchill, and proceeded to Repulse Bay, from whence, taking advantage of a chain of lakes, he transferred his boats to the western side of Melville Peninsula. Here he found a large expanse of water, the shores of which he succeeded in tracing during that and the following summer—on the west, to the Lord Mayor's Bay of Sir J. Ross, and on the east, to within a very short distance of the Fury and Hecla Strait of Parry: to this he gave the name of Committee Bay; it is beyond doubt the Attoolee of the intelligent Iligluik. From the Esquimaux with whom he communicated, he could obtain no information respecting Franklin. Public anxiety for the fate of that great man and his companions now demanded the immediate despatch of searching expeditions. The success of the combined researches of 1825, and the subsequent years, justified the adoption of the same plan, and accordingly Capt. Moore, in the *Plover*, was ordered to Behring's Strait; Sir John Richardson and Dr. Rae were despatched over land to the Mackenzie; and two vessels, the *Enterprise* and the *Investigator*, were fitted out under the command of Sir J. C. Ross and Capt. Bird, to proceed direct to Lancaster Sound. A reward of £20,000 was offered by government to any who should render efficient assistance to Sir J. Franklin, and to this Lady Franklin, out of her private resources, added £3000 more. In the year 1848, Captain Kellett, in the *Herald*, was despatched to the assistance of the *Plover*, and the *North Star* was sent, under the command of Mr. Saunders, with supplies for the missing expedition, and instructions to Sir J. C. Ross to keep his ships together and examine Wellington Channel if an opportunity was afforded, and afterwards, if possible, the *North Star* was to examine the sounds hitherto not penetrated at the head of Baslin's Bay.

The *Plover*, a dull sailer, having wintered at Noovel in Kamschatka, was overtaken by the *Herald* in Kotzebue Sound, where they were

joined by Mr. Shedden in his yacht, the *Nancy Dawson*; and, having in vain endeavoured to penetrate beyond  $72\frac{1}{2}^{\circ}$  N. latitude, the *Plover* was left to winter in Kotzebue Sound, while the *Herald* and *Nancy Dawson* returned to Mazatlan, where Mr. Shedden died, overcome by the fatigues and anxieties of the voyage; but Commander Pullen, having been sent forward with boats, effected the passage from Wainwright's Inlet to the Mackenzie, and the following summer traced the coast eastward to Cape Bathurst. So that, notwithstanding Dr. Rae had failed in his attempt to make the traverse of Wollaston Land, it could be confidently stated that the expedition of Franklin had not reached the American coast between Behring's Strait and the longitude of Melville Island; and although these expeditions returned without tidings of the missing voyagers, Captain Kellett enriched geography with the discovery of an extensive land, having a bold coast 1400 feet above the sea, in latitude  $71^{\circ} 20' N.$ , longitude  $170^{\circ} 30' W.$

The expedition of Sir J. C. Ross also returned without success, having been beset with ice and carried bodily out of Lancaster Sound into Baffin's Bay, until abreast of Pond's Bay. Yet he had traced the coast of North Somerset in winter journeys on foot, and observed that only a very narrow isthmus separated Prince Regent's Inlet from the western sea at Creswell and Brentford Bays, through the latter of which indeed Captain Kennedy afterwards found a passage in the summer of 1851, and thus proved that Sir J. Franklin had not been detained on any of the coasts or islands in that direction, but rather must have pushed on beyond Melville Island, to the north or west. Further efforts were therefore to be made, and the highly organized researches of 1850 will be long remembered in the annals of geographical discovery. The *Enterprise* and the *Investigator* were again commissioned and despatched to Behring's Strait under the command of Captains Collinson and McClure; two large vessels, re-named the *Resolute* and *Assistance*, with two screw tenders, the *Pioneer* and *Intrepid*, were fitted out to renew the search in Barrow's Strait, under the command of Captains Austin and Ommanney, and Lieutenants Osborn and Cator; while two others, one a ship re-named after Lady Franklin, the other a brig, named the *Sophia*, were placed under the command of Capt. Penny, an old and experienced whaler; and while Sir J. Ross, aided by private subscriptions, backed by £500 from the Hudson's Bay Company, was enabled to take the command of a schooner named the *Felix*, after Sir Felix Booth, and a small tender, the *Mary*, of twelve tons burden, Dr. Rae was also ordered to organize expeditions to the west of the Mackenzie, and to conduct one himself in the direction of Cape Walker; and lastly, a citizen of the United States, Mr. Grinnell, of New York, rivalling in generosity Sir Felix Booth, prepared two vessels, the *Advance* and the *Rescue*, for the same service, which he placed under the command of Lieutenant De Haven, of the United States navy, who had been with Captain Wilkes in his exploring expedition to the Pacific; finally, Lady Franklin herself fitted out the *Prince Albert* ketch, of eighty-nine tons, under the command of Captain Forsyth. Thus eleven vessels, well manned and equipped, met together to prosecute the search for Franklin in the summer of 1850. Captain Austin's instructions were to reach Melville Island and search the shores of Wellington Channel and the coast about Cape Walker. Captain Penny was to penetrate through Jones's Sound, if possible, or if not, into Wellington Channel. Sir John Ross, acting of course on his own discretion, proposed the examination of Melville Island and Banks's Land; while the *Prince Albert's* course was to be directed to Prince Regent's Inlet and the adjacent coasts. De Haven's researches were especially directed to Wellington Channel. All were cautioned against remaining out the second winter, as all were provided with ample means to make expeditions by land during the first. To give detailed accounts of the operations of these various expeditions, would far exceed the limits of necessity assigned to this subject. It must therefore be sufficient to state the general results.

Of the vessels despatched to Behring's Strait, the *Investigator* alone suc-

ceeded in her attempt to get to the eastward. Captain M'Clure proposed endeavouring to reach Banks's Land by way of Cape Bathurst, and was fully prepared to remain in the Arctic regions until 1854. The *Plover*, under Commander Moore, was stationed as a store-ship at Port Clarence, in Behring's Strait; and from thence Captain Collinson, in the *Enterprise*, sailed to make a second attempt to penetrate the north-east, in July, 1851. The *Herald* returned home in the autumn of 1850.

The numerous and well-appointed vessels forming the expeditions to Barrow's Strait sailed under one serious disadvantage—separate commanders and divided responsibility; and to this may justly be attributed, if not the practical want of success, at least the unpleasant reflections and recriminations which resulted from it. On arriving at the scene of their labours, Captains Austin and Ommanney divided their squadron, with the intention of examining respectively the southern and northern shores of Lancaster Sound. The latter, during his search, found traces of the missing expedition of Franklin at Cape Riley; and when subsequently rejoined by the former, failing in the endeavour to penetrate to the westward, the expedition went into winter quarters at Griffith Island.

Captain Penny, finding it impossible to enter Jones's Sound, proceeded towards Wellington Channel, and on Beechey Island discovered the winter quarters of Franklin in 1845-6. Believing Sir John to have gone to the north, he would have pursued his search in that direction, but was prevented by the ice, as he was also in his subsequent effort to penetrate to the westward; and accordingly he went into winter quarters also, in Assistance Bay, at the mouth of Wellington Channel, to the eastward of the spot selected by Captain Austin, where he was joined by Sir John Ross; who, on being released from the ice in the following August, returned home. To Sir John Ross's belief in the report of the Esquimaux interpreter, that Franklin's vessels and crews had been destroyed at Wolstenholme Sound, is to be attributed some loss of time on the one hand, and on the other the subsequent expedition of Captain Inglesfield. The only geographical result of his expedition was an exploration of part of Cornwallis Land by Commander Phillips.

The American expedition under De Haven, unable to penetrate into Wellington Channel, attempted to proceed westward; but failing, as others had done, in that, determined to return home for the winter, but being caught in the pack ice, was drifted with it through Lancaster Sound and Baffin's Bay, until June in the following year, when he returned to the north-west; but, unable to get beyond Melville Bay, he again steered homeward, where he arrived safely in September. The return of the *Prince Albert*, unsuccessful in the attempt to penetrate Regent's Inlet, the same year, brought the exciting news of the discovery of Franklin's winter quarters, and the absence of all traces of the expedition in other directions. Lady Franklin, therefore, sent back that vessel, now under the command of Captain Kennedy, of the Hudson's Bay Company, who carried with him Sir John's old and faithful companion, Hepburn. In the interim, Captain Pullen, who had been dispatched by way of the Mackenzie, to achieve, if possible, the passage from thence to Banks's Land, returned, as Rae had done, without success.

The spring of 1851 will ever be memorable in the history of Arctic discovery, for the number and success of the expeditions made in sledges, and the extent of surface travelled over. From Captain Austin's squadron no less than fourteen sledges were despatched, with above 100 officers and men. The zeal and constancy with which these were conducted may be estimated by recording the labours of Lieutenant M'Clintock, who travelled in eighty days a distance in direct line from the ships, of 350 miles, reaching the western shores of Melville Island. By these various parties the coast to the north, south, and west of Lancaster Sound was carefully examined; and though little was added to the geographical knowledge obtained from the first expedition of Parry, yet it was satisfactorily ascertained that Franklin could not have passed westward in that direction. Captain Austin therefore, when

released from the ice, left Lancaster Sound with the intention of examining Jones's Sound, but, being prevented by the ice, returned home. Captain Penny's sledge expeditions were directed towards the north: here he was stopped by open water, but the jealousies consequent on divided authority prevented the examination of this important channel, up which there could be little doubt that Franklin had proceeded; and Captain Penny also returned home. In these journeys Captain Austin's parties traversed 3914 miles, and Captain Penny's 2220, which, with 150 by Sir J. Ross's crew, make a total of 6284.

During the same spring Dr. Rae had left Great Bear Lake, and from thence with sledges reached the mouth of Coppermine River, and, crossing over the ice to Wollaston Land, surveyed the coast between  $110^{\circ}$  and  $117^{\circ} 17'$  of longitude, thus concluding the most extensive series of sledge explorations ever carried out in any country in one season. The following year he traced the south and east coasts of Victoria Land, from the longitude of Cape Alexander to latitude  $70^{\circ} 14'$ , a voyage interesting no less from its extent than from the conclusion which naturally follows from Dr. Rae's observations—viz., that a channel exists separating Wollaston and Victoria Lands from those to the north and east, named Banks and Prince of Wales' Lands; which, when combined with the discovery of the channel already referred to by Captain Kennedy, places it beyond doubt that a vast mass of land, intersected by numerous channels, lies between Baffin's Bay and the open water to the north-east of the Mackenzie River; in which discovery must ever be difficult and dangerous, as well as unproductive of useful results, except to science.

In 1851-2, Captain Kennedy did not get farther than Batty Bay, and making excursions to the south, in January discovered, at Brentford Bay, a channel dividing North Somerset from Boothia Felix, which he named after Lieut. Bellot of the French Navy, a volunteer with his expedition; and having examined the shores to the west and north, as far as Ommamey Bay, sailed for Beechey Island, where he communicated with Sir F. Belcher's squadron, and returned home. This expedition, despatched from England in April, 1851, was formed of the four vessels already well known in the service, the *Assistance*, *Resolute*, *Pioneer*, and *Intrepid*, with the addition of the *North Star* as a store-ship. It reached Beechey Island in August, and leaving the *North Star* there as a depôt, divided; Sir F. Belcher, with the *Assistance* and *Pioneer*, proceeding in open water up Wellington Channel, while the other vessels under the command of Captain Kellett, sailed for Melville Island, to communicate, if possible, with Captains Collinson and M'Clure. Thus much, which is all we know respecting them, we obtain from the accounts brought home by Captains Kennedy and Inglefield, the latter of whom was sent in a small screw steamer, the *Isabella*, to examine the northern and western shores of Baffin's Bay. At Wolstenholme Sound his careful examinations satisfactorily proved the falsehood of the Esquimaux's statement of the destruction of Franklin's vessels and crews by that people; and to the north his discoveries have placed beyond doubt that Whale Sound and Sir Thomas Smith's Sound are channels leading into some larger expanse of water, probably a polar basin, which may communicate with the Atlantic to the east, and with Wellington Channel and Behring's Strait to the west. It is to be noted, also, that Captain Inglefield reached the highest northern latitude ever attained on the American coast—viz.,  $78^{\circ} 36'$ —and, had he been in a condition to have wintered, might have gone much further.

Of the ultimate result of these expeditions conjecture only can be offered, excepting that there appears no reason to doubt that communication will be established between Captains Kellett and Collinson and M'Clure, across Melville Island, since its western shores were reached by Parry's and Austin's expeditions, and we know of nothing to prevent access to it from Behring's Strait. To the north, however, all is uncertain, though the rise of temperature and presence of animal life lead to the conclusion that open water, by which alone they could be occasioned, must exist in that direction; and that there-

fore egress from it will be found in other directions, as access to it has been from Wellington Channel. But, in reviewing the whole course of maritime discovery, as we cannot but be struck with its gradual progression, adapted precisely to the wants of the human race in the different periods of its political and social development, we are necessarily drawn to the conclusion that there is no portion of the world without its proper and particular use, and that even the frozen regions of the north will eventually be found to have not only important physical relations to the rest of the world, as the researches of science prove, but that they have yet to perform an important part of the economy of human life; and that therefore the life and treasure which have been expended on their discovery will not have been altogether wasted.

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Having thus taken a very brief and rapid survey of the progress of maritime discovery, we are better prepared to contemplate the surface of the earth in its horizontal contour, and its apparent divisions of land and water. It is for others to record, with the minuteness they deserve, the labours and sufferings, the heroism whether of ardour or endurance, which have been necessary to the attainment of the results which geography claims as her own: such details belong to History and Morals. It may, however, be well to indicate where most easily those details can be supplied without the expense of time and labour which original researches require. Mr. Cooley's *History of Maritime and Inland Discovery* is in itself a most complete index to, if it be not a perfect epitome of the subject, containing all that is most worthy of note or most interesting in the more voluminous compilations of Hakluyt, Purchase, Churchill, Harris, Prevost, &c., and is particularly valuable with reference to Africa and the East. Barrow's account of Voyages in the South Sea, with those of Hawkesworth, lead up to Cook and Vancouver, and the later discoveries in that ocean are carefully epitomized in *Findlay's Directory to the Pacific*.

A most admirable sketch of Portuguese and Spanish discovery in Western Africa and Central America is to be found in a recent valuable addition to the history of the sixteenth century, entitled *The Conquerors of the New World and their Bondsmen*; a very useful outline of Arctic discovery has been compiled by Mr. J. J. Shillinglaw; and the original chronological list of Locke, with all its conciseness, as it has been the basis on which most subsequent compilers have established their labours, is still most useful.

The history of inland discovery being of course confined to the countries of which it treats, is naturally local in its character, and is therefore reserved until each portion of the world comes separately under our notice.

# DESCRIPTIVE GEOGRAPHY.

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## PART THE SECOND.

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### CHAPTER I.

INTRODUCTION.—1. Of distribution.—2. Of proportion.—3. Of position.—4. Of contrast in vertical contour.—5. Effect of vertical contour on climate.—6. General laws of reliefs.—7. Results of comparison.—8. Of geological contrast.—9. Of contrast in climate.—10. In productions.—11. In man.—12. General conclusions.

IN describing the surface of the Earth, the first consideration that presents itself is its division into land and water; and before proceeding to more detailed inquiries, three things must be understood in relation to this—viz., distribution, proportion, and position.

1. *Of Distribution.*—The unequal distribution of land and water has been already noticed (*Physical Geography*, p. 216). It may be further considered hemispherically or in zones. The former is perhaps that which most readily presents itself in consequence of there being two great masses of land, apparently divided from each other by vast expanses of water; and if, as will be seen by the tables which follow, the area of the land may be estimated in comparison with that of the water as 1 to  $2\frac{1}{2}$ , the same proportion will be found between the western and eastern continents, and very nearly between the Atlantic and Pacific Oceans. In dividing the globe hemispherically from north to south, we see a preponderance of land in one hemisphere, and of water in the other. In the Old World the breadth of the mass of land averages  $160^\circ$ , and in the New less than  $80^\circ$ ; while the centre of both is cut by the opposite meridians of  $80^\circ$  from Greenwich. Again if the hemispheres be separated by the Equator the same result will follow, but in two ways, for not only will the distribution be found unequal as before—the mass of land in the eastern continent predominating to a great extent—but the northern will contain more than the southern. In the southern, however, although the area of water far exceeds that of land, yet the proportion of land is more equal. Lastly, if we place Great Britain in the centre of one hemisphere, we shall find it contains nearly all the land in the world, while its antipodes are in the centre of a corresponding mass of water. (See *Physical Geography*, p. 149.) This unequal but so far regular distribution of the great masses of land and water will be found to have had an important effect on the history of the human race, especially in its commercial relations.

The latter mode of considering this distribution is not less important; for



while by the former we perceive causes which have contributed to place the great masses of the human race in close proximity, this has given to the localities in which they are found, the climate, and consequently the productions, of the Earth most suited to the development of the mental and physical capacities of man.

In pursuing this inquiry, Malte Brun arrived at the following estimate of the distribution of land and water in zones :

Northern Hemisphere.		Southern Hemisphere.	
Icy zone . . .	0.400	Icy zone . . .	0.000
Temperate . . .	.559	Temperate . . .	.075
Torrid . . . .	.297	Torrid . . . .	.312
<hr/>		<hr/>	
Average . . .	.419		.129
<hr/>		<hr/>	

In this calculation it will be observed that the land about the Antarctic Pole is not estimated ; but even if it should ultimately prove considerable, as the recent discoveries in the Arctic zone lead to the conclusion that there is much more land there than was formerly believed, the proportion may be esteemed sufficiently correct, and does not much exceed that already found to exist between the oceanic and continental masses. Estimated in English miles, the contents of the zones have been thus calculated :

Northern Hemisphere.		Southern Hemisphere.	
Arctic . . .	3,252,589	...	—
Temperate	28,531,631	...	3,828,036
Torrid . . .	11,628,440	...	12,215,735
<hr/>		<hr/>	
Average	14,470,887		8,021,885
<hr/>		<hr/>	

Of which calculation it may be remarked, that it shows very strongly the predominance of land in the northern hemisphere ; for while in it the land in the torrid zone is about equal to that in the southern, and in both cases above the average, in the temperate the land is double the average, and more than double that in the torrid zone, of the southern hemisphere, which is nearly four times that in the temperate.

From this consideration, it will be apparent that the northern temperate zone, as the centre of the life and energy of the human race, will always be the centre of political and commercial influence as it has hitherto been, and that Great Britain being the centre, or as it might be termed the clasp of that zone, has a position in this respect equal, if not superior, to any other in the world. The extreme linear extension north and south of both continents placing her within 80° of one half of each continent, while the whole of North and Central America, South America on the west coast to Lima, and on the east to the southern confines of Brazil, the whole of Africa, and the entire mass of Asia, part of Cochín China, and the Malay peninsula alone excepted, being above the horizon, are within 5400 miles direct distance. And that this advantage of position is singular may easily be seen ; for if, after placing London in the zenith, the globe be turned westward, Southern, Central, and great part of North America immediately disappear below the horizon, and their place is occupied by water ; while, if it be turned eastward, and America be brought uppermost, the greater part of Africa and the whole of Southern Asia with its islands disappear in like manner ; and not only does Great Britain thus occupy the centre of the habitable world, but commands the ocean routes round both continents, as will be seen in considering the linear extension of the shores of the ocean ; as well as a direct route across the Arctic Ocean to Behring's Strait, which may possibly at no very distant date be found practicable ; while in addition to her proximity to the outstretched points of the shores of

the Atlantic, and the overland route to the East, which the continent of Europe offers her, she no less commands those across the isthmuses of Suez and Panama. This important position will, however, be fully considered when treating of our own country more particularly, but it should never be lost sight of by the British geographer.

The distribution of the masses of land and water also confers on the countries antipodal to Great Britain, a position of considerable importance as the natural centre of trade of the Great Southern Ocean, and as commanding the communications round Cape Horn and the Cape of Good Hope—the passages between the extremities of the lands; for, from the south of New Zealand, the Auckland, Macquarrie's, and Balleny's Islands, approach Victoria Land;\* while from Cape Horn, the South Shetland Islands, and Graham's Land, appear extensions of the mass of the Antarctic land, leaving, in either case, but comparatively narrow passages between them; while to the north the islands of the Pacific lie grouped in their numerous archipelagos; and to the east Australia extends her vast surface, to the western and northern portion of which, these considerations seem to give a greater importance than they have hitherto received.

It may also be noticed, that while Behring's Strait, and the seas between Iceland and Europe and America respectively, lie between 60° and 70° N. lat., the passages above referred to between the southern extremities of the continental masses and the Antarctic land are in about the same relative latitude; and further, that while the greater mass of land is found to the E.N.E. and S. of Great Britain, the greater mass of water is found in a corresponding position with respect to its antipodes; in other words, they are opposed to each other on the surface of the globe, in character as well as position.

2 *Of Proportion.*—The proportion of land and water has been thus estimated. (See chapters IV. and V. *Physical Geography.*)

*Superficial Area of Land.*

Eastern Continent . . .	33,000,000	
Australia and Islands . .	4,000,000	
Western Continent . . .	14,500,000	
	<hr/>	
		Total Land 51,500,000

*Superficial Area of Water.*

Pacific Ocean . . .	90,000,000	
Indian „ . . .	23,000,000	
Atlantic „ . . .	30,000,000	
Arctic „ . . .	3,000,000	
Antarctic „ . . .	2,000,000	
	<hr/>	
		Total Water 148,000,000
		<hr/>
		199,500,000

*Or more generally.*

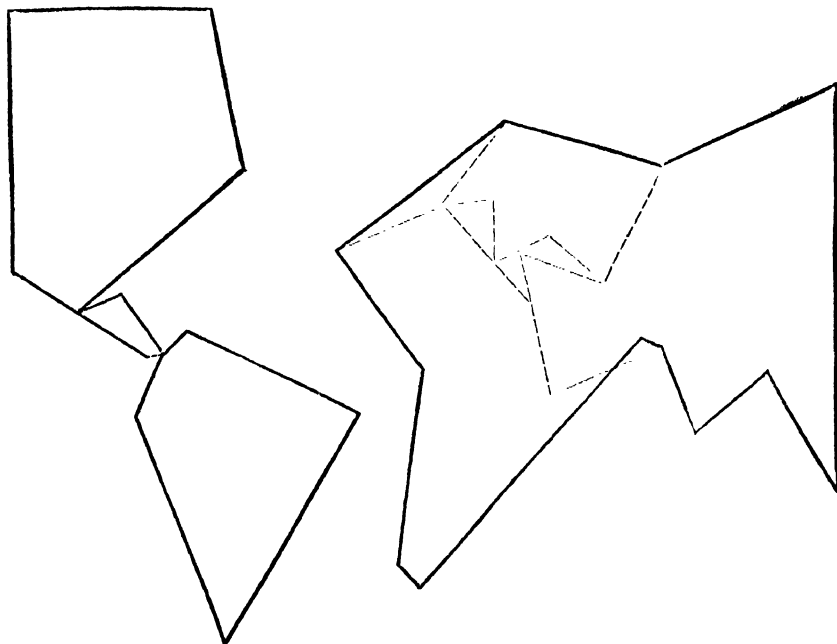
Land . . .	52,000,000
Water . . .	145,000,000
	<hr/>
	197,000,000

The following normal figures constructed as proposed in the *Theory of Description*, p. 419, will convey to the eye a just idea of the relative propor-

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\* As an illustration of this, it may be noted that a direct line drawn from the Land's End to Canterbury in New Zealand passes round Cape Horn in the usual track of vessels, and as New Zealand is only about 400 miles beyond our Antipodes, this is within that distance the shortest line that can be drawn on the globe between those points, and certainly the shortest route that can be taken.

tion of the two great masses of land, and facilitate the application of the accompanying tables :



In these figures, the natural divisions of both continents are apparent: the eastern into Europe, Asia, and Africa, as shown by the dotted lines; the western into Northern, Central, and Southern America. The small size of Central America, and its relative position, make it desirable, in general calculation, to include it in the northern division.

These figures have been constructed by inspection and measurement on an 18-inch globe, to enable all students the more readily to test their accuracy, and teachers to explain their construction and application. For more minute calculation, by mathematical process, a table of the position of the points from which the lines, including the figures, are drawn, is subjoined. For the length of their sides see Appendix B.

*Positive position of Places at angles of normal figures.*

**Eastern Continent:—**

Lewis (Western Isles Butt)	58°31' N. Lat.	6°14' W. Long.
Gulph of Kara (S. point by estimation)	67°30'	67°30' E. Long.
Cape Navarin	62°16'	178°56'
Singapore	1°17'	103°50'
Calcutta	22°33'	88°19'
Cape Comorin	8°5'	77°30'
Cape Monze	24°51'	66°37'
Cape Babelmandeb	12°41'	43°27'
Dardanelles (castle of Asia)	40°9'	26°24'
Cape Apcheran	40°12'	50°20'
Gibraltar	36°7'	5°21' W. Long.
Nice	43°42'	7°17' E. Long.
Cerigo	36°7'	22°59'
Odessa	46°28'	30°44'

Guadel . . . . .	N. Lat.	E. Long.
Cape Ras el Had . . . . .	22°23 "	59°55 "
Cape Agullas . . . . .	34°59 S. Lat.	20° "
Cape of Good Hope . . . . .	33°36 "	18°28 "
Fernando Po . . . . .	3°48 N. Lat.	8°43 "
Cape Verde . . . . .	14°43 "	17°34 W. Long.
Western Continent:—		
Cape Romanzov . . . . .	61°49 "	166°18 "
North-East Point of Greenland . . . . .	75°50 "	19°20 "
Cape Race . . . . .	46°40 "	53°7 "
Tehuantepec (S. Fr. de) . . . . .	16°11 "	94°44 "
Cape St. Lucas . . . . .	22°52 "	109°53 "
Cape Catoche . . . . .	21°36 "	87°6 "
P. Caribana (Gulf of Darien) . . . . .	8°38 "	76°55 "
Cape Mala . . . . .	7°25 "	80°2 "
Point Gallinas . . . . .	12°25 "	77°44 "
Cape St. Roque . . . . .	5°28 S. Lat.	35°16 "
Cape Horn . . . . .	55°59 "	67°16 "
Cape Blanco . . . . .	4°17 "	81°16 "

In calculating the comparative extent of the continental masses, the following will also be useful:

North Cape, Norway . . . . .	71°11 N. Lat.	25°40 E. Long.
Cape Roca (Lisbon) . . . . .	38°46 "	9°30 W. Long.
Cape Severo . . . . .	78°25 "	108° E. Long.
South-East Point of Corea . . . . .	35°15 "	129°42 "
Cape Bon . . . . .	37°4 "	11°3 "
Cape Guardafui . . . . .	11°50 "	51°16 "
Cape Disappointment . . . . .	46°16 "	124°5 "
Coro, New Grenada . . . . .	11°24 "	69°46 "
Chicaren Point, G. of Conchagua . . . . .	13°17 "	87°44 "

*Superficial Area.*—All calculations of superficial area must be esteemed approximations. The following tables will show that, even among British geographers, considerable differences are found in their estimates. They are selected from five of the most popular, and are in English miles of  $69\frac{1}{2}$  to a degree at the Equator.

*Comparative Tables of estimated Area.*

	Highest.		Lowest.		Mean.
Europe . . . . .	3,900,000	...	2,635,700	...	3,732,540
Asia . . . . .	17,500,000	...	15,526,300	...	16,683,260
Africa . . . . .	12,000,000	...	8,902,000	...	11,048,000
America, North . . . . .	8,500,710	...	7,400,000	...	7,666,900
America, South . . . . .	6,500,000	...	6,147,450	...	6,355,813
	<u>48,400,710</u>		<u>40,621,450</u>		<u>45,486,513</u>
*Eastern Continent . . . . .	33,000,000	...	33,000,000	...	33,000,000
Western ditto . . . . .	14,000,000	...	12,892,600	...	13,630,866
	<u>47,000,000</u>		<u>45,892,600</u>		<u>46,630,866</u>
Area, Land . . . . .	60,000,000	...	39,956,600	...	50,318,866
Area, Water . . . . .	150,000,000	...	108,200,930	...	131,566,976
Total Area . . . . .	<u>210,000,000</u>		<u>148,187,500</u>		<u>184,895,833</u>

\* Three writers out of the five omit this calculation.

Typographical errors may probably account for the differences found in the calculations of any one writer, for instance in the area of Asia given in Black's edition of Malte Brun, 1832, as 154,000,000, which is evidently a misprint of an additional cipher: but when, in Europe, the smallest of the areas calculated, a difference is found of one-third of the highest, and half of the lowest estimate, it is evident that the bases of the calculations must be so different as to make an average estimate of little value for general purposes; therefore the estimate already given (*Physical Geography*, c. iv.) may be assumed sufficiently accurate.

For the purposes of comparison, however, more particular calculations are required; and as, when made in English miles, the difficulty of reduction is often a source of confusion, those of Guyot are adopted, being made in geographical miles of sixty to a degree at the equator; and having been used by him in his lecture on Physical Geography for that purpose, the results will be more easily estimated. It will be seen that they are considerably below those given in the former part of this work.

	Superficial Area.	Coast Line.	Proportion.
Europe . . . . .	2,688,000	17,200	156
Asia . . . . .	14,128,000	30,800	459
Africa . . . . .	8,720,000	14,000	623
North America . . . .	5,472,000	24,000	228
South America . . . .	5,136,000	13,600	376
Australia . . . . .	2,208,000	7,600	290
<b>Total . .</b>	<b>38,352,000</b>	<b>107,200</b>	<b>2132</b>
<b>Average . .</b>	<b>6,392,000</b>	<b>17,866</b>	<b>338*</b>

From this it will be seen that the disproportion of the area to the coast line is more considerable in Europe than in any other division of the globe, and that the sequence is as follows: Europe, North America, South America, Africa, Asia, or, with the exception of South America, in inverse proportion to their size. The islands, however, which cover the eastern coast of Asia, give an additional value to her in this relation, and with the irregularity of the southern and eastern coast, and her inland seas, compensate for the otherwise enormous extent of her area, which is nearly equal to the united areas of Europe, Africa, and one division of America.

A comparison of the linear extension of the coast line of the continental

\* According to the estimate already given, the above table would stand thus:

	Superficial area.		Coast line.		Proportion.
Europe .....	3,550,000	...	17,250	...	205
Asia .....	14,150,000	...	28,500	...	496
Africa .....	10,550,000	...	18,000	...	811
North America.....	6,700,000	...	22,250	...	302
South America.....	5,800,000	...	12,035	...	481
<b>Total .....</b>	<b>40,750,000</b>	<b>...</b>	<b>94,035</b>	<b>...</b>	<b>2225</b>
<b>Average .....</b>	<b>8,150,000</b>	<b>...</b>	<b>18,807</b>	<b>...</b>	<b>457</b>

Mr. Peterman's calculation is as follows:

Europe .....	3,900,000	...	17,000	...	229
Asia .....	17,500,000	...	35,000	...	500
Africa .....	11,870,000	...	16,000	...	741
North America } .....	14,000,000	...	3200	...	437
South America }					
<b>Total .....</b>	<b>47,270,000</b>	<b>...</b>	<b>100,000</b>	<b>...</b>	<b>1907</b>
<b>Average .....</b>	<b>11,317,500</b>	<b>...</b>	<b>20,000</b>	<b>...</b>	<b>381</b>

masses, with the sums of the sides of the normal figures containing them, will further illustrate this subject.

	Normal figure.	Coast line.	Decimal proportion.
Europe . . . . .	8,220	17,200	2.092
Asia . . . . .	17,280	30,800	1.724
Africa . . . . .	13,500	14,000	1.037
North America . . . .	11,340	24,000	2.116
South America . . . .	10,170	13,600	1.337
Total . . . . .	60,510	99,600	8.307
Average . . . . .	12,102	19,920	1.661

From the above it appears that North America and Europe differ in their coast line most from their normal figures. It should, however, be noted, that the greatest irregularities of the former are in the frozen north, while those of the latter are to the south. Asia approaches very nearly to the mean proportion. Australia would present about the same proportion as South America, but for the purpose of comparison it certainly cannot with justice be separated from the adjacent islands if it may from the continent of Asia.

3 *Of Position.*—The positive position of the extreme angles of the continental masses may be ascertained from the preceding table. More generally it may be stated, that the eastern continent extends between the meridian of 15° W. and 185° E. long., and between the parallels of 75° N. and 35° S. lat.; while the western extends from 30° to 160° W., and from 70° N. to 55° S.; the greatest extension of the one being from N. to S., and of the other from E. to W., or more properly from N.E. to S.W. The relative position of the continental masses makes them almost continuous; for while to the north of the Atlantic, from the shores of Iceland, the distance is only 200 miles from Greenland and 700 from Norway; to the north of the Pacific, at Behring's Strait, the shores approach within thirty-six miles of each other, and the continuity of the vertical contour of the land is marked by the shallowness of the adjacent seas. In this direction also the line of the principal mountain chains, of volcanic action, and consequently of the axes of elevation and depression, will be found continuous throughout the globe.

The calculations already given, have shown that as the Atlantic is to the western, so is the Pacific to the eastern continent. The distance of the points on the coast may be estimated as under :

*Table of Distances between the shores of Europe, Africa, and America, and between America and Asia.*

	G. M.
Blasquet Island (Ireland) to Cape Spear, Newfoundland . .	1,631
Cape St. Roque to Cape Palmas . . . . .	1,759
Cape of Good Hope to Cape Horn . . . . .	3,591
Cape Agullas to Tasman Head, Van Diemen's Land . . . .	5,289
Tasman Head to Cape Horn . . . . .	4,777
San Francisco, California, to Chusan . . . . .	5,360
N.E. Cape, Asia, to east part of Melville Island . . . .	1,548

It has been well observed that what the Mediterranean was to the ancients, and the traders of the middle ages, the Atlantic is to us. Indeed, the present facility of communication between the shores of the latter is far greater than in earlier times it was between those of the former. This has, it is true, been effected by the power of steam, for whereas not so very many years since there was no certainty of communication between England and even France or Ireland, now there is regular fortnightly communication across the Atlantic. The facilities for this, which its long and comparatively narrow channels and deep indentations present, form, as has been

shown, important elements in the estimation of the comparative position of the continental masses.

The main channel of that ocean connects the Arctic Ocean in a direct line with the Pacific by the Caribbean Sea, and the southern shores of North America and Europe with the Indian and Pacific Oceans by the Cape of Good Hope and Cape Horn; the former in a direct line from the head of Baffin's Bay, the latter in as direct a course from the shores of Norway; while the wide expanses and deep inlets of Baffin's Bay, Hudson's Bay, and the Gulf of Mexico, on the one hand, and the Mediterranean, Black and Baltic Seas, on the other, offer an extent of coast for commercial intercourse not elsewhere to be found on the surface of the earth.

While the shores of the Atlantic have this deeply indented character, those of the Pacific afford facilities of a different description from the islands with which they are lined in the north, and from the innumerable groups of islands which supply the place of a coast line to the south. Like those of the Atlantic, the shores of the North Pacific lie nearly in a straight line, and consequently the communication afforded by them is as direct as possible.

In considering this subject, it is desirable that a globe should be used rather than a map, neither the ordinary hemispherical, nor the cylindrical projection of Mercator, giving the true impression to the eye. This, indeed, no map can do, though the stereographic projections in ordinary use with respect to the land, might very properly be applied for this purpose to the water;\* and the use of the artificial globe cannot therefore be too strongly recommended. Much confusion has, since the time of the early cosmographers, been the result of the constant use of maps rather than globes, and it will take long to remove the erroneous impressions thus formed.

A table of distances, taken between well known points, which will be found in Appendix B, will illustrate the importance of the above considerations, and especially confirm what has been said respecting the use of the globe in acquiring a knowledge of geography; they are taken from a route map of the world, published by Mr. E. Stanford, of Charing Cross, on which the actual routes are laid down, and make the direct line apparent; while the indirectness of the apparent course is most clearly seen. This also appears on the relief map of the world in the atlas attached to this work.

The angularity of the channels of the Atlantic, and the linear extension of the shores of both oceans, direct attention, in the next place, to the comparative vertical conformation of the continental masses from which they result.

**4 Of Contrast in Vertical Contour.**—In contemplating the two great Continents in this relation, we observe—

- 1st. That the line of greatest elevation accords with the watersheds of the basins of the Pacific and Indian Oceans; and
- 2nd. That in consequence of this, the highest elevations in the globe are most distant from each other; while the greater expanses of the lower lands are brought into more immediate communication by the channel of the Atlantic.

From the first, it might be expected that the terminations of the Continents to the south would be promontorial, as Lord Bacon remarked; and of considerable elevation, as Foster noticed. This would also make the existence of islands beyond them more probable than that of a large southern continent. And the same careful observer notices this also. He, as the companion of Cook, had been an ocular witness of the fact, and of the absence of that Terra Australis, the extent of which Dalrymple had so pertinaciously maintained. (See 'Maritime Discovery,' page 176.) The knowledge that volcanoes of considerable elevation have been found in the Antarctic regions, suggests the probability that evidence of the continuity of the vertical contour will hereafter be discovered in that direction.

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\* A stereographic chart of the North Pacific, constructed for this purpose, was exhibited at the meeting of the British Association at Hull, September, 1853.

It has been further remarked by the same writer, that these facts may be taken as evidences of the violent action of water on the continental masses from the south; and perceiving the deep indentations which present themselves on the western shores of South America, Africa, and Australia, he gave that cataclysm also a westerly origin. This hypothesis favours another, namely, the submersion of a large mass of land towards the south, that Australia and the Islands of the West Pacific are the remains of a submerged continent. Depression and elevation are, as has been shown (*Physical Geography*, chapters 4 and 7), common; so much so, that they may possibly be found to be the constant conditions of the surface of the globe. But these elevations and depressions are, for the most part, gradual. Forster's hypothesis is dependent on the suddenness as well as the greatness of the rush of waters. Modern science, and especially the researches of M. Elie de Beaumont, lead to the conclusion, that the forms of the continental masses are due to elevation and depression only; the connexion between the geological epochs and periods of elevation, is a subject foreign to the present purpose; but the rectangular direction of the axes of elevation, as shown by him, confirms the importance of, while it fully accounts for, the linear extension of the coast lines. It has already been noted (*Physical Geography*, c. 7), that the linear extension of volcanic action coincides with that of the greatest elevation, as well as with the areas of greatest known elevation and depression; and this is further illustrated by the list of volcanoes given at p. 271, *Physical Geography*. Moreover, as hitherto the greatest depths discovered in the ocean have been considerably south of the Equator, the slope of the basins of the ocean in that direction may be conjectured, as well as the tabular nature of the bottom of the North Pacific, of which the islands of that ocean may be considered the buttresses and supporters. On this subject, however, our information is lamentably deficient. It will be treated of as fully as may be, in the chapters to be devoted to the Oceans and their Islands. The system of M. Elie de Beaumont, which he has fully developed with respect to Europe, will be further considered in reference to the orography of that continent. (*Systèmes de Montagnes*, par M. E. de Beaumont. 3 vols. Paris.)

The analogies suggested by Forster have been expanded and enlarged by Pallas, Humboldt, Steffens, Ritter, and subsequently by Guyot (*Earth and Man*, English Edition. Lond. Chap. ii.). Besides the principal promontorial extensions towards the south, others scarcely less marked are observable, as India, the Corea, Kamschatka, Greece, Italy, Scandinavia, in the Eastern Continent; and California, Florida, Nova Scotia, in the Western; to which may be added, from their position, of such islands as Great Britain, Newfoundland, Greenland, Madagascar, the Japanese Islands; and those on the North Western coast of America, all, of course, indicating elevation.

A further analogy has been observed in the threefold grouping of the continental masses, of which the best example is afforded by the western. Steffens further remarked, that the connexion of the more southern portion in both cases was by a narrow isthmus; and carried the analogy so far as to discover that both had deep indentations, containing archipelagos opposed to the other, with a peninsular extension on the other side; as on the East, the Mediterranean, with its islands, and Arabia; and on the West, the Gulf of Mexico, the West Indies, and California; but in such relation the Eastern might not improperly be considered a double continent—Australia balancing Africa, and the islands and seas of the Indian Archipelago those of our Mediterranean basin. Cochin China, and Arabia, would thus correspond with Central America, and the peninsula of India be the caudal appendage common to both. But Steffens considers Australia, and its adjacent islands, as a third triple group. These analogies, however, have been by many thought exaggerated; those more general ones, which have been already adopted and extended from Ritter, are certainly more valuable.



To these may be added the contrasts presented by the two great masses into which the land on the surface of the globe is divided.

The contrast in linear extension has been already referred to, and an important consequence follows this arrangement—viz. that while the great mass of land in the eastern continent lies within the same climatic zones, the western, from its greater proportionate length, and its linear extension from north to south, traverses nearly all. Further, the eastern division presents all its parts in more immediate connexion, and is therefore more ‘eminently continental’ than the western, which, from its comparative narrowness, may be esteemed oceanic. The eastern continent, moreover, has its own characteristic vertical contour, presenting mountains extending into table lands and plateaux; while the western, offering only mountains and plains, characterized by the simplicity of its forms of relief, is more easily comprehended and described; and as in position it is oceanic, so its waters occupy a much larger portion of its surface.

5 *Effect on Climates.*—The contrasts in Orography and Hydrology naturally include those of climate and production, the details of all which will be found under the head Physical Geography. But the importance of elevation in this respect may be estimated by the consideration that 350 feet of elevation equal one degree of thermometrical depression, or about one degree of latitude, while a few thousand feet reach the base of the eternal snows, which are the winding-sheet of animated nature on the tops of the mountains. This will be apparent from the subjoined table, which has been so frequently copied from Humboldt, of the estimated level of the line of perpetual snow on different mountain ranges in different latitudes, and on their different slopes.

TABLE OF ELEVATION OF SNOW LINE.

*Northern Hemisphere.*

Places.	Lat.	Elevation.
Norwegian Coast . . . . .	71°15' N.	2,400
Inner Norway . . . . .	70°15'	3,500
Ditto . . . . .	67°30'	4,200
Iceland . . . . .	65°00'	3,100
Inner Norway . . . . .	62°00'	5,100
Siberia . . . . .	60°55'	4,500
North Wales . . . . .	59°40'	4,800
Kamschatka . . . . .	56°40'	5,200
Ounalashka . . . . .	53°44'	3,500
Altai . . . . .	51°	7,000
Alps . . . . .	46°	8,800
Caucasus Elbrouz . . . . .	43°21'	11,100
—— Karleek . . . . .	—	10,600
Pyrenees . . . . .	43°	9,000
Rocky Mountains . . . . .	43°3'	12,500
Ararat . . . . .	39°42'	14,200
Asia Minor (Mount Argæus) . . . . .	38°33'	10,700
Bolor . . . . .	37°30'	17,000
Sicily (Etna) . . . . .	37°30'	9,500
Spain (S. N. of Granada) . . . . .	37°10'	11,200
Hindoo Koosh . . . . .	34°30'	13,000
Himalaya (N. side) . . . . .	31°	16,600
Himalaya (S. side) . . . . .	—	13,000
Mexico . . . . .	19°15'	14,800
Abyssinia . . . . .	13°10'	14,100
South America (S. N. de Merida) . . . . .	8°5'	15,000
South America (Tolima) . . . . .	4°46'	15,300
South America (Purace) . . . . .	2°18'	15,400

<i>Equator.</i>			
Places.		Lat.	Elevation.
Quito . . . . .		0°0	„ 15,800
<i>Southern Hemisphere.</i>			
Andes of Quito . . . . .		1°30 S.	15,800
Bolivian Andes (E.) . . . . .		18°	„ 15,900
Bolivian Andes (W.) . . . . .		—	„ 18,500
Chili Penquenes . . . . .		33°	„ 14,700
Chili (Andes of coast) . . . . .		44°	„ 6,000
Strait of Magellan . . . . .		54°	„ 3,700

It thus becomes apparent, that while the snow line falls generally from the equator to the poles, it rises on the sides of the greatest general elevation, the greater mass of land generating or retaining the greater quantity of heat. This is true in all cases, but most remarkably so in Asia, where the influence of its great central masses elevates the snow line on the north 3600 feet above its level to the south.

6 *General Laws of Reliefs.*—This illustrates what Humboldt calls the effect of elevation, and shows the necessity of considering and comparing the forms of the different continents in their vertical contour or relief. This will be found treated generally in the fourth chapter of the part of the work devoted to Physical Geography. It may be sufficient here to subjoin, in a tabular form, Humboldt's estimate of the effect of elevation preparatory to a comparison of reliefs. This may be considered in two respects of equal importance.

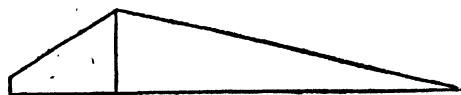
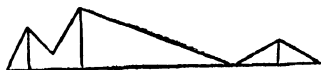
1. Elevation in mass of lowlands, plains, table lands, and plateaux.
2. Linear extension of mountains and ranges of hills.

And in following out these it will appear—

1. That all the continental masses rise gradually from the sea to some line of greatest elevation in the interior.
2. That this line is placed out of the centre at unequal distances from the limits of horizontal contour.
3. That the height of elevation in mass will correspond with that of linear elevation; and that—
4. The greater number of subsidiary lines of elevation will be found on the side of the greatest extension.

The importance of this in systematizing geographical description has been already shown in treating of the theory of description.—(p. 423.)

The extreme line of elevation, or, as we have termed it, primary watershed of a continent, is therefore the apex of the triangle formed with the base of its section above the sea level, i.e., the normal figure of its relief in a certain direction. The following examples and tables will illustrate the importance of the consideration of the continental masses in these relations, which is more fully shown in the orographic map of the atlas attached to this work.



*Table of Length of Slopes and Culminating Points of Continental Masses.  
Reduced from Guyot.*

	Length of Slopes.		Culmination.
Asia, from Frozen Ocean to Ganges . . . . .	N. 2600	S. 400	... 28,178
America, S., from River Marañon to Pacific . .	E. 1850	W. 70	... 21,400
America, N., from Washington to St. Francisco .	E. 1600	W. 800	... 14,000
Europe, from Baltic to Lombardy . . . . .	N. 450	S. 100	... 12,800
Average . . . . .	<u>1615</u>	<u>342</u>	<u>19,094</u>

*Table of Length of Slopes and Culminating Points, to agree with Diagrams  
in reverse order.*

Asia, from Frozen Ocean to mouth of River Kistna . . . . .	N. 2520	S. 840	... 20,000
America, S., from River Marañon to Pacific . .	E. 1740	W. 120	... 21,400
America, N., from Nova Scotia to Pacific . .	E. 2040	W. 450	... 15,000
Europe, from Arctic Ocean to Gulf of Genoa . .	N. 960	S. 120	... 15,700
Average . . . . .	<u>1815</u>	<u>382</u>	<u>18,025</u>

*Table of Proportion of Elevation to Base.*

	Extent.	Elevation.	Proportion.
Asia . . . . .	3360	20,000	5.952
South America . . . . .	1860	21,400	10.967
North America . . . . .	2490	15,000	6.024
Europe . . . . .	1080	15,700	14.444
Average . . . . .	<u>2197</u>	<u>18,025</u>	<u>9.346</u>

The above tables are calculated on opposite principles, the one taking the mean and the other the central extension of the continental masses at right angles to the principal elevation, South America, being in both cases the same, though in that estimate more appropriate to the second. In South America, also in both cases, the line chosen passes through the culminating point, as it does also in that of Europe.

7 *Results of Comparison.*—The general results are, nevertheless, sufficiently apparent when compared with the diagrams and tables of effect produced by elevation, showing very plainly the more simple forms of South America, the superficial extension of Asia, and the irregular and highly developed forms of North America and Europe.

*Comparative Table of Effect to Proportion of Elevation to Base.*

	Effect.	Proportion.
Asia . . . . .	1151	5.952
South America . . . . .	1132	10.967
North America . . . . .	748	6.024
Europe . . . . .	671	14.444
Average . . . . .	<u>925</u>	<u>9.346</u>

*Table of Proportion of Elevation to Effect.*

Asia . . . .	1151	...	20,000	...	17.202
South America .	1132	...	21,400	...	18.904
North America .	748	...	15,000	...	20.053
Europe . . . .	671	...	15,700	...	24.483
Average	<u>925</u>	...	<u>18,025</u>	...	<u>20.160</u>

Assuming then one thousand miles of extension to 9000 feet of elevation as a rough average on the continental masses, it will be seen that while North America and Asia are about in the same proportion below and above the average, Europe is considerably below, affording another and very marked example of the variety of her configuration.

In Asia, then, we find the highest mountains, the most extended and elevated table lands;

In South America, the most extended plains and greatest elevation in proportion to the shortest slope, and the greatest contrast between the opposite slopes;

In North America are intermediate configurations, the East approximating to Europe, the centre to South America, and the North and West to Asia; while in Europe we find the greatest variety and the greatest elevation in proportion to extension.

The continuation of these reliefs into the oceans cannot, under our present imperfect knowledge, be attempted; nevertheless, it may be noticed that the comparison just instituted bears out the remark already made (p. 209), that the deepest water will probably be found in the Southern Ocean, while the Arctic and North Atlantic will be found comparatively shallow, and the bottom of the North Pacific bear the same relation to the volcanic chains of East Asia and North-west America, that the table lands of central Asia do to the Himalaya. The following general table of proportions arranged from the preceding will complete the apparatus for forming a sufficiently accurate contrast.

	Long and Short Slopes.		Extent of Elevation.		Effect of Elevation.
1. Asia . . . .	3,000	...	5,952	...	17.202
2. South America	14,500	...	10,967	...	18.904
3. North America	4,533	...	6,024	...	20.053
4. Europe . . . .	8,000	...	14,441	...	24.483
Average	<u>4,751</u>		<u>8,200</u>		<u>20.160</u>

This affords the following sequences:

1.3.4.2                  1.3.2.4                  1.2.3.4

showing that while the proportion of effect to linear elevation is in regular order, as stated above, according to the third rule which has been deduced by Guyot, the others are not constant, and do not appear to follow any general law.

It may be well therefore to follow out the comparison in another way—viz., by considering the general character of the surfaces of the continental masses.

It has been already noticed that the character of North America is intermediate. The northern portion of that continent has a very similar character to that of Northern Asia; thus to the north of the 32nd parallel in the one, and of the 42nd in the other, we have the largest extent of lakes and water surface throughout the earth; in both cases this is connected with a long and very gentle slope, as well as with the greater extension in breadth; both present their shore to the Arctic basin, and in this direction the present greatest axis of upheaval in both continents would appear to be situated. This would

suggest a contrast of the land surfaces of our globe as they surround that basin, and show the relative value of North and South hemispherical comparison, or, even more, of that by land and water hemispheres. To the south, in both cases, we have a great river with a vast delta flowing in its middle course through wide extended plains; on the one hand, the Ganges; on the other, the Mississippi; while the Euphrates and Tigris, with the saline districts about their head waters, and the extremes of aridity and fertility which they present, bear strong analogy to the Columbia and the rivers which fall into the bay of San Francisco. On the east of America we have a district not dissimilar, though in some respects inferior to that of the west of Europe, while the eastern coast and islands of the Old World bear no small resemblance to the West Indies and Central America. Africa and South America stand alone, and in striking contrast. Australia and New Zealand have intimate relations with both, and with respect to them, the intermediate character that North America bears to the other continental masses.

*8 Of Geological Contrast.*—The same may be said of the formation of the superficial crust of the earth—i.e., the geology of these districts, and especially in relation to the position of the more useful minerals and metals. Thus we find the larger deposits of coal in Central and Western Europe, and in the central and eastern portions of North America; here, also, we find abundance of iron and copper. These productions, the necessary materials for manufacturing industry, thus abound where life will be always most abundant, while the greater masses of the precious metals, as they are called, gold and silver, are located nearer the equator.

This arrangement, which generally obtains, is not, however, probably so remarkable as the immediate propinquity of these masses to the natural lines of communication either on the coast, as in Australia and California; near great lakes and rivers, as in North America; in an insular position, as in Great Britain, or in proximity to the more general facilities for transport afforded by the varied configuration of Europe; and if this subject be considered in reference to the most important present use of coal, now the most precious of all minerals, it will be seen that the localities in which it is found are such as would be most desirable to facilitate the rapid intercourse which modern social and commercial requirements necessitate, being placed not only in those routes into which commerce is now being carried, but in larger quantities, where manufacturing interests, and the consequent accumulation of inhabitants and constant traffic, are now or hereafter to be found.

In this connexion we observe,—1st, that the coal fields of North America, the largest at present known, are placed in the centre, and at the eastern extremity of her natural lines of communication; and this is, perhaps, the most striking example that can be adduced. By the Mississippi and its affluents, access is obtained to nearly one-third of the entire surface of that portion of the New World; by the river Saint Lawrence and its great lakes, to one-third more; these are connected directly to the east and west, with the corresponding sea-boards, and most immediately with each other, and the Arctic Ocean. Thus the valleys of these rivers, and the adjacent country, are the most desirable localities for coal: and here, and on both sea-boards, that mineral occurs in abundance, the largest deposit being near the centre, or rather the convergence of these lines, and in close proximity to its other mineral wealth, and even the northern coast presenting it in abundance, as well as other minerals; and thus affording proof that hereafter it is to be brought into commercial relation with the other portions of the world. What is true of North America, is also true, though not to the same extent, on account of its more simple form, of South America, and more especially of Europe, and other portions of the world's surface. Our own country, Belgium, France, Germany, and Italy, afford illustrations of this; as do the peninsula of India, Southern and Western Australia.

2nd. That what is true particularly, is true also generally, as has been observed, the longer routes of commerce being, it might be said, indicated by

these localities. Thus in connecting Europe and America, we have coal at both ends of the route, and it occurs near the extremities of the two continents. The long voyage from the Cape of Good Hope to Australia is broken by Kerguelen's Island, where coal is deposited. In Australia it abounds, and is found in New Zealand. India possesses abundance for manufacture, as well as internal and external communication. The route from the Cape of Good Hope, or from Australia to China, is supplied by a deposit in Borneo, and probably by others in the neighbourhood. China and Japan have both plenty, while the route from North West America to China has not only coal at both extremities, on the West as already mentioned, and on the East in Vancouver's Island and other parts of British America, but along the whole route which follows the direction of the coast line. South America has also coal to facilitate communication between the Atlantic and Pacific by the Isthmus of Panama, as well as across and around that ocean; and even the inland seas, as the Mediterranean, Hudson's and Baffin's Bay, the Gulf of Saint Lawrence, and the Gulf of Mexico, are not without it.

Nor are the overland routes, not directly connected with river valleys, or passing from one to another, less fully supplied. The line from England to the Black Sea, through Germany and Russia, has abundance. Extend the same line to India, and it does not fail. Pass from the great lakes of Canada to the coast of the Pacific, and you find it half way, on the Saskatchewan. And although of these localities we know less than of those already referred to, yet we know enough to predicate, without hesitation, that it will be found wherever it is most wanted, for the general good of mankind, the spread of civilization and commerce, the bringing men more into communication with each other, the consequent extension of knowledge, and, by consequence, of the Christian religion, and of love and charity between the families of mankind; so that we may now adopt more fully than has ever yet been done, the words of the Psalmist—'O Lord, how manifold are Thy riches! in wisdom hast Thou made them all: the earth is full of Thy riches!'

9 *Of Contrast in Climate.*—The consideration of the extent and elevation of the continental masses leads naturally to those of climate and productions. With respect to these, it has been already observed, that the greater surface of the land lying within the temperate zone, possessing a climate and consequently productions most suited to the residence of man upon it, is the more historically and practically valuable portion of it, and must so continue.

In regard to climate, however, important results follow directly from the vertical contour of the continental masses, especially with regard to the presence or want of moisture (see meteorological map of the world in atlas attached to this work): this will depend on two causes—the direction of the currents of air near the surface of the earth, and proximity to the ocean; the former must be in a great measure influenced by the relief of the continents, especially by the mountains and valleys, and upon the results of both the presence of animal and vegetable life, and their character, must very much depend.

The currents of air are generated by difference of temperature, and will be found generally taking the direction of the linear elevations of the continental masses, with the exception of the trade winds, which are indeed only winds acting without any disturbing influences arising from vertical configuration, as may be seen by their cessation on approach to continents, or even islands, as in the Pacific, where they are replaced by monsoons directly they reach the insular portion of its surface.

This is observable, on the coast line, in the North Atlantic, where north-east and south-west winds predominate; in the South Atlantic, where the reverse may in general terms be asserted; in the North Pacific, where they are for the most part directed by the trending of the coast, as they are also in the Indian Ocean. It will follow that, wherever opportunity for precipitation is found in the conformation of the coast district, there will be

an abundance of moisture; wherever a river, or lacustrine basin, or deep indentation of the coast line offers facility for it, that moisture will be carried far inland. Thus Europe, although not possessed of great river basins, from the configuration of her coasts, is abundantly supplied. America, for the opposite reason, has no lack; but in either case, the table lands of Spain and Mexico, diverting the currents of air towards other localities, are, in proportion to their relative extent and elevation, deficient in this important element of natural production. The vast lateral extent of Northern Africa and Central Asia, separated on all sides from the sea by mountain ranges, includes the most arid districts in the world. The plateaux of Asia, Persia, Arabia, and Thibet, not only present the same obstacles as those of Europe and America, but lie within that limit. Central Australia and Southern Africa labour under both disabilities, not only presenting the obstructive barriers of mountain ridges on the coast to the action of water-bearing currents of air, but by their wide expanse having their larger surfaces removed from the sea. The same may be said in a less degree of the southern portions of South America. They are, therefore, partially, the great generators of the currents of air, as being the localities of the greatest heat and least moisture. These, the great air-pumps of the earth, as producing the rarefaction and vacuity on which the motion of the atmosphere depends, maintain by their constant action its healthy condition; and, although least fitted for his residence, themselves are most important in making other places fit for the residence of man.

In the immediate locality, and in the direction of the elevations radiating from or parallel to those districts, are found those also of greatest precipitation. These are within the deepest indentations of the coast line and the most insular portions of the surface of the ocean; India and its islands, Western Africa, the West Indies, British America, east and west, and Western Europe. Of these, the three former and most important are in close proximity to the most important mountains in the world, the Himalayas, the Andes, and the Plateaux of Mexico; and though we know but too little of the mountain system of Africa, we know enough to predict with certainty, that its greatest elevation must not be far from its western coast, a little to the north of the equator, as the primary water-shed of its most important river, and consequently close to the district of the greatest precipitation which is found in that latitude, on the shore of the Indian Ocean.

But what is true of the coast line, is no less true of the interior. In this respect, the contrast of the two great continents is very marked; for while in North America a slight elevation of about 1800 feet offers no impediment to the passage of the currents of air, and thus affords not only moisture, but extremes of heat and cold to the interior of that continent; while in the northern part of South America, the connexion which exists between the Orinoco and Marañon, proves a corresponding slightness of distinction between their main basins; in Europe and in Asia, with the exception of the broad waters of the Ganges and Indus, and the Rhine and Danube, the rivers are separated by important elevations, and the passage of currents of air impeded; the climate of those countries is therefore more variable, if not less extreme. The vast expanse of both continents towards the north is, of course, exposed to the full influence of water-bearing winds; but the influence of the frozen zone interposes to vary and modify its effects.

And in this relation the currents of the ocean, and even its tides, are not to be omitted, for though with respect to the former we have not data sufficient to form just conclusions as to the influence of the vertical contour beneath the surface in their formation, we do see most plainly the influence of vertical contour above the surface. Thus the main currents (see meteorological map) flow round the great projections of the continental masses, and receive their direction from the linear configuration of the coast lines: thus the shores of Western and Northern Europe feel the influence of the warm current of the gulf stream, and South America of the cold current from the Antarctic seas (see Part I., p. 235 *et seq.*), and similarly the great

tidal wave modified by the larger projections of the Continent, and retarded in its progress by the windings and indentations of the coast lines, not only receives its direction from them, but is regulated as to its velocity, so that it reaches districts within nearly the same limits of positive position at very different times; in one case may be so diffused as to be scarcely perceptible, as in the Pacific, in another be accumulated into a bore, as in the narrow channels of the coasts of the Atlantic and Indian Ocean, in the British Channel, the Bay of Fundy, and the mouth of the Hooghly river, where advancing in solid mass with fearful rapidity, it has rather the appearance of an inundation caused by some convulsion of nature.

The distribution of heat and cold is similarly modified by vertical contour, by means of which we get the eternal snows of the Pole, and an Arctic flora beneath the vertical rays of a tropical sun (see p. 210).

10 *In Productions*.—From what has been said, another contrast becomes apparent between the eastern and the western continents similar to that already noticed, and, indeed, dependent on it. The table lands of the Old World wanting moisture can never present the same vegetable productions in the same proportion as the well-watered plains of the New; these, therefore, present incitements to the residence of man upon them which the former never can; and here we see the fecundity of nature in vegetable life to an extent unparalleled elsewhere. To this reference has already been made in the portion of this work on *Physical Geography*; but it may be further remarked, that the similarities already observed may be carried out thus far, the vegetable productions of North East America assimilating with those of North West Europe, the West Indies, and Central America, with India and its islands, &c., the distinctive features of the vegetation of the Old and New World being of course maintained.

The distribution of animal and vegetable life from this cause, also affords interesting contrasts, not only in the general way already alluded to, but more particularly. If, for instance, the limits of the cultivation of grain be considered, they will be found confined by the great mountain ranges, and following their linear extension. River and lacustrine basins, and indentations of the coast line also afford their distinct localities for varieties of Fauna and Flora, not unfrequently confining them within their limits. In islands, of course, this is even more observable; while the great mountain chains form all but impassable barriers against the transmission of either, except by the instrumentality of man; but these things need not be enlarged upon, as they have been already treated of at length, in the chapter on *Physical Geography* appropriated to them.

11 *In Man*.—Finally, as already noticed in the chapter on the *Theory of Description* (p. 423), the vertical contour of the earth's surface has mainly determined the paths of man's migrations, and fixed the limits of the habitations of the human race; and it has been shown how preparations have been made for his more extended dispersion, and at the same time more intimate communication by the distribution of minerals and metals. In the chapters devoted to that consideration, it will hereafter be seen how atmospheric and aqueous action, the winds and currents of the ocean, contribute to this great end. Here it will be only necessary to remark, that the table lands of the Old World afforded the easiest means of locomotion to man in his infancy; while the Mediterranean basin, embosomed between the three divisions of the Old World, presents the natural cradle of more extended commerce and navigation; that the valleys of the Nile and Danube afford access respectively into the interior of the continents, but with very different results; for though in both cases they are cut off from immediate communication with the great central basin, yet to the one there is opened a varied field for the development of the human mind in its social relations, which has subsequently extended the influence of the countries to which it tends, Germany, France, and England, over the whole world; on the other, the vast but comparatively increased expanse of Africa presented little to further such development, and offered



no extensive connexion to its inhabitants, who are therefore at present the least advanced of those of any of the continental masses. Further, the range of the Himalayas, confining for the most part the nomad races of the vast steppes of Asia to the north of its linear extension, and its spurs to the east separating China from communication with the south, has given the northern and eastern portions of Europe and Asia into their hands; and thus three great and well defined varieties of the human race have resulted, the main areas of which are indicated in the small ethnographical map (in Plate v. of the Atlas), which shows at a glance the influence of vertical contour on distribution, and, in conjunction with what has already been said, gives sufficient reasons why the least extended and numerically smallest of the three should be historically the most important, and that also which, by its influence upon the others, is doubtless hereafter to effect an amalgamation which shall raise them to its standard, and, at last, possibly, absorb the more distinctive varieties, whether of physical conformation, habit, or language.

12 *General Conclusions.*—In concluding this introductory chapter, it may be again noticed that all these similarities and contrasts depend, first, on the vertical contour of the land, and secondly, on position; that the mass of Asia presenting vast mountain chains, buttressed by massive table lands extending into immense plains, watered by rivers second only to those of the New World, presents a type of all other portions of the continental masses; that America, in its more simple configuration, with its two great features of mountains and rivers, is most intelligible; while Europe and part of North America, to which no doubt hereafter must be added North East Asia, are the portions of the world's surface most worthy of study, and which will best repay for their detailed consideration; they are moreover those which are affecting the world most at the present time; they are those where our own race is working out its gigantic destiny; to them therefore particular attention will be directed. Asia historically the first, and as,—if not because it is,—the type of all the others, should come first in the series. The Mediterranean basin, and consequently Africa and Europe, next in order; thus combining the whole eastern world, after which the contemplation of the western will be easy.

The general connexion of the whole will be completed by the consideration of the two great divisions of the ocean and the islands they contain, as well Australia, New Zealand, and the Eastern Islands, appertaining to Asia, and the West Indies, and others belonging to America; and also the more oceanic and distant islands, which, however subaqueously connected with the continental masses, and forming links between them, are too distant from their shores to be considered in more particular description as appertaining to them. But as historically our knowledge of the Atlantic preceded that of America, and as that ocean is the link between the two continents, its consideration may more properly assume that place in the series.

## CHAPTER II.

## OF ASIA.

1. Historical sources of our knowledge of the Interior.—2. More recent information.—3. Of the boundaries and limits.—4. Of the coast line.—5. Of the watersheds.—6. Of orographical classification.—7. Classification of rivers.—8. Of geological formation.

**HISTORICAL** *Sources of our Knowledge of the Interior.*—To the information obtained by European travellers in the middle ages, by Carpini, De Rubruquis, Pegoletti, the Poli, and others, respecting the interior of Asia, but little was added for about two centuries. The course of traffic having been transferred from the land to the sea, and passed from the hands of the Genoese and Venetians into those of the Portuguese, the Dutch, the French, and subsequently the English.

The mission of Chancellor to Moscow had, however, made known the importance of the inland commerce which Russia, even at that time, enjoyed with the interior of Asia, and, in 1558, Anthony Jenkinson, a merchant of importance engaged in the Russian trade, was despatched on a journey for the purpose of opening the interior of Asia to English commercial enterprise, which though unsuccessful, so far as its primary object was concerned, added much to the knowledge then extant of the countries through which he passed.

His voyage and journey extended down the Volga to the Caspian sea, and from the port of Mangerslave, at its South Eastern angle, through the land of the Turkman, along the course of the Oxus to the city of Bokhara.

Here he found a great change since the palmy days of Tatar rule, for although it was still the centre of the internal commerce of Asia, that having been interrupted, especially from the east, by war, its importance had diminished accordingly. Jenkinson returned to Moscow convinced that it offered no inducement to English merchants.

His observations, however, fixed with greater accuracy the position of many important places, and reduced the boundary of the Caspian sea to something nearer its present proportions.

The stimulus given to English commerce in the chivalric period of the reign of Elizabeth induced the merchants of London to endeavour to extend the Levant trade, which they were then beginning to take out of the hands of the Venetians. For this purpose, Messrs. Fitch and Newbury proceeded overland to India, by way of Aleppo and Bagdad to Ormuz and Goa, but the appearance of Sir Francis Drake in the Indian seas had created a not unnatural panic among the other Europeans there, and the travellers were thrown into prison at Goa, and prevented extending their journey to China. The success of Drake and his followers led to the adoption of the sea route to India, and its maintenance until the recent re-opening of the so-called overland route by way of Egypt; to the formation of the East India Company; and the sending Hawkins as ambassador to the Great Mogul in 1607.

During this interval, however, Russia was extending her knowledge of the interior. About the period of Jenkinson's mission Anika Strogonoff established a lucrative fur trade with Siberia, and, obtaining grants of land there from the Czar, founded several colonies. Russian troops also made incursions as far as the river Ob, and Ivan Basilievitz extended his empire to the shores of the Caspian. The Cossacks inhabiting those districts plundered the caravans; troops were sent for their protection, and at length Yermac Trinovief, a Cos-

sack chief, driven by the Russians from his own country, attacked the Tatars, defeated Kutchum Khan, and subjugated the country about the river Irtysh; finding, however, his situation precarious, he invited the protection of Russia; the Czar sent troops to his assistance, but these were surprised and cut to pieces, and Yermac perished in his flight; but soon after more Russian troops were sent into the country, the fortresses of Tobolsk, Sungur, and Tara were founded, the authority of the Czar finally established in Siberia, and the frontiers of his empire extended with great rapidity to the Eastern Ocean and the confines of China; indeed, to its farther extension that empire alone opposed any serious obstacle.

In 1639, the Russians became acquainted with the great river Amur; in 1643, Wasilei Pojarkof followed the course of that river to the sea, and proceeding northward along the coast returned to Yakutsk, a town recently built on the river Lena, from whence he had set out by a different route. This led to an attempt on the part of the Russians to subjugate the Tatar tribes inhabiting the banks of that river, and brought them into collision with the Chinese. The immense distance of the seat of war from Moscow, and the difficulty of sending men and supplies so far through so difficult a country, gave the advantage to the Chinese, and brought about a treaty by which the country about the river Amur, and the navigation of that river, was ceded to them. Under Peter the Great a Russian factory was established at Pekin, and privileges of trade given to the Russians, but these latter were forfeited, their people expelled on account of their bad conduct, and the trade subsequently confined to a caravan every three years, but permission was accorded for the establishment of a Greek church, and the residence of scholars at Pekin. This arrangement, made by Count Ragusinski in 1728, has continued until now.

As the Amur had given a means of transport to the Russians as far as the North Pacific, so the other great rivers of Northern Asia afforded means of traversing its interior and arriving at different parts of its coasts, from whence subsequent expeditions, as already noticed, continued to extend geographical knowledge. Their first establishment on the Lena was formed in the year 1636; in 1644, Michael Staduchin built a fort on the Kolyma, and in 1650, after the discovery of the mouth of the Anadir by Deshniew, having discovered that river to be the same as the Pogitska of which he had heard, proceeded overland to it from the Kolyma; here he found Deshniew, and together they established a lucrative trade in sea-horse ivory.

In 1696, the Cossacks penetrated into Kamschatka, and in the following year Wolodimer Atlassow commenced the conquest of that peninsula, and finally, it having been found impossible by the Russians to circumnavigate the great promontory of Tshutskoi Noss, but it having been crossed by Staduchin, who reported its inhabitants as dangerous from their ferocity, in 1701, an expedition was organized for their subjugation. The contest lasted ten years, and since then they have enjoyed semi-independence; recent expeditions to Behring's Strait have added to the knowledge of the coast of that country obtained by Cook and his followers. It was not only towards the East that Russia had extended her discoveries or the limits of her territories; Jenkinson had been followed, in his exploration of the Caspian, by Christopher Borrough in 1580; in 1633, Oelschläger, or Olearius, a professor of Leipsig, examined and ascertained the position of several points on the western and southern shores of that sea, when accompanying an embassy from the Duke of Holstein to the Schah of Persia, and Peter the Great employed Dutchmen, under Charles Van Verden, to make a chart of that sea, which was afterwards submitted to the French geographer, Delisle. Further information was obtained by Jonas Hanway, in 1745, from an expedition despatched by English merchants to open the trade of India from Astrackan, and subsequently the expedition of Gmelin and Hablitzl fixed its limits with some precision; it was, however, reserved for our own times, and the recent expedition sent by the Russian government, to complete our knowledge of that sea, and to present an accurate chart of its shores.

Some knowledge of the countries to the east of the Caspian was also obtained

in the reign of Peter the Great, who despatched Alexander Beschowitz, a captain of his guard, with a small army, to take possession of the countries about the river Oxus, gold having been reported to be found there in large quantities. Beschewitz was, however, defeated and killed by the Tatars. Russia has never ceased to extend her knowledge of the interior, but until the present century the labours of other Europeans were, for the most part, confined to the districts near the coasts.

Since the year 1836, regular accounts of the progress of geographical knowledge have been published by the Royal Geographical Society, in its journal annually, and from these the obligation which we owe in this particular to different travellers may be seen. It will be sufficient, therefore, in this place, to notice them by name, as the information obtained from them will be embodied in the description of the countries through which they travelled. These may be, for convenience, arranged under the following geographical classifications:—

1. The great northern plain of Siberia and Central Asia. 2. China. 3. The Eastern Islands and Peninsula. 4. The Peninsula of India and the Valleys of the Ganges and Indus. 5. Kashmere, Khurdistan and the countries on the slopes of the Himalayah mountains. 6. Persia and Armenia. 7. Arabia Palestine, and Syria. 8. Asia Minor.

In the first division we find the names of Ermann, Fuss and Wrangel, as affording information of the countries on the lower course of the great northern Asiatic rivers, Kamschatka, Lake Baikal, and the connexion between Asia and America respectively; Klapproth in Central Asia; Leocline, Basiner, and Atkinson, in the Steppes of the Khirghis; of Federow, Karilim and Middelendorf in Siberia; Beghalowski and Zelman in Alpine Tartary; Shrenk and Tchikatchef in the Altai, and Sayanes; Murchison, de Verneuil, and Halmers, in the Ural; de Moulhereux, in the Caucasus; Abich in the country between the Black and Caspian Seas: Hommaire de Hell, on the coasts of the Caspian; Basiner, Abbot, and Shakespear, in Khiva; and Silverhjelm on the frontiers of China.

In the second, Davis, Bruguiero, Vignault, Hue and Gabet in Chinese Tartary; the embassies of Macartney and Amherst in China; Bethune, Colchester, Caltinson, and others on the great rivers, and their connexion by canals, and, more generally, Gützlaff and Fortune. In Japan, Van Siebold and Doelf.

In the third, Newbold in Malacca; Reinwarte, Raffles, and Junghuhn in Java; Oliver in Molucca and Celebes; Horsburgh, Rienzi, Earl, Crawford, Low, Brook, Keppel, Mundy, Belcher, Gordon, Stanley, &c., in the Archipelago generally.

In the fourth, between Persia and the Valley of the Indus, Stirling, Burnes, Massom, Edwards. In Scinde, and on the Indus, Burnes, Carless, and Outram; Du Vernet in the Punjaub; on the eastern frontier, Pemberton, Richardson, and McLeod; Hetfer in Tenasserim, and Hannay on the Irrawady; Grandjean in Siam, besides those engaged in the general government surveys, conducted by Lambton, Everest, and Waugh.

In the fifth, Moorcroft, Hoffmeister, Hügel in Cashmere; still farther north and to Lè, the capital of Ladack, Cunningham, Strachey, Thomson, Des Granges, de Koros: in the Himalayah, Colebrook, Madden, Hooker, Forbes Royle, Johnston, Lloyd, Herbert, Guthrie, Trebeck, Young, Agnew, and the Gerards; on the north-west frontier Kandahar and Kurdistan, Conolly, Burnes, Wolf, De Bode, Shiel, Ainsworth, Lynch, Vigne, Jackson and Irwin, Grant and Chamcours, Vivien de St. Martin, and Badger; Wood, at the source of the Oxus; Rose and Monteith on the Caspian, all united to Persia by the labours of Rawlinson, Layard, and their fellows; and Johnston at the source of the Jumna.

In the sixth, Rich, Morier, Lynch, Ross, Ponjoulat, Campbell, Selby, Rassam, and, above all, Chesney, Layard, and Rawlinson, &c., &c., in Mesopotamia and on the rivers; as also Brent, Hamilton, Grant, Glascott, Southgate, Letellier and Chopin; Forbes, in the Sinjar and Scistan, and Kempthorne, on the eastern shores of the Persian Gulf.

In the seventh, of De Laborde, Wellsted, Bird, Cruttenden, D'Abaddie, Botta, Koller, De Wrede, Carter, Amand, and Brockman, Wallin and Lepsius; in that Peninsula and Palestine, Lindsay, Berton, Robinson, Smith, Napier, Beke, Symonds, Wilson; Moore and Molyneux on the Dead Sea; in Syria, Chesney; Barker on the Orontes; Parrot at Ararat; Pollington in Syria and Asia Minor; Engelhart on the shores of the Black Sea.

In the eighth, Callier and Texier, Raoul Rochette, Hamilton, Fellows, Cohen, Ainsworth, Rassam and Russell, Davidov, Forbes and Hoskyn in Lycia; Bone about the sources of the northern rivers, Kiepert and his companions; Branfort on the northern coast; and all summed up, combined, and enlarged in the careful and elaborate survey of Tchichatcheff, one part of which has recently issued from the Paris press.

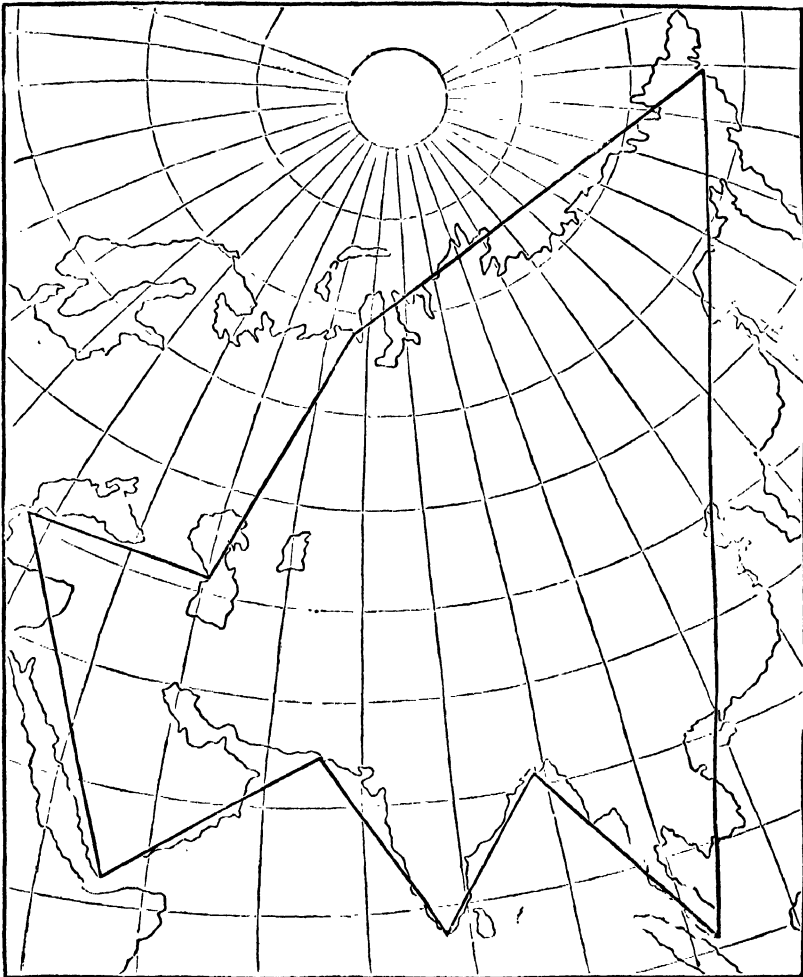
This long list, incomplete as it no doubt is in many respects, will show what has been done of late years to increase our knowledge of the vast continent which historically is the cradle of the human race of civilization, literature, and science. It will be apparent from their well-known names, that by far the great majority of these travellers, those to the north and east of course excepted, have been engaged in a military or political capacity on the frontiers of the dominions of Great Britain in Asia, and under the authority of the East India Company, and especially in originating and carrying into effect means of overland transport between Europe and Hindostan.

It would be obviously impossible within the limits of the present work to do more than give the names of those to whom we owe our knowledge of the particulars of the geography of the interior of Asia. The mention of their names alone appears of little practical utility, unless it be taken as an index of the amount of labour from which our knowledge is derived, and the opportunities afforded in their works to individuals to make themselves more intimately acquainted with it. It must be remembered, also, that Asia, on account of the size and variety of configuration for which it is distinguished among the continental masses, demands more extensive labour for the elucidation of its geography than the others; and, indeed, as will appear in its description, much more remains to be done.

Having thus given indications of the sources from whence our knowledge of the interior of Asia is derived, its boundaries and limits must be next detailed.

3 *Of the Boundaries and Limits of Asia.*—Asia is bounded physically by the Arctic Ocean on the north; by Behring's Straits and the Pacific on the east; by the Straits of Malacca and Indian Ocean on the south; and by the Red Sea, the Mediterranean, the Sea of Marmora, and the Straits of the Dardanelles and Bosphorus, and the Caspian Sea on the west. The exact boundary on the land cannot perhaps be defined at either extremity; but at the Isthmus of Suez it is usually given as from Suez to El Arish, while the Oural Mountains are taken as the boundary on the north, from the Sea of Kara, and from their southern declivity, the river of the same name may perhaps be best assumed; the natural division between the Black Sea and Caspian will be the watershed of the Caucasus. Formerly the Don was considered the natural boundary: subsequently, as European knowledge extended westward, arbitrary lines from the mouth of the Don to that of the Dwina, and even the Obi. Pallas proposed a division purely political; Malte Brun, the course of the rivers Manich and Kouma, from the Sea of Azov to the north of the Caspian. The Russian geographers, however, whose interest in the subject, and more recent and exact knowledge, give them the best title to decide the question, have fixed on that taken above. The boundary given in the Straits of Malacca may be, as has already been suggested, physically incorrect, but it is recommended by convenience and sanctioned by custom.

The positive position of the limits of Asia, as connected with the normal figure, will be found in the table at pages 204-5. It may, however, be well to contrast them with the extreme points which project beyond those selected for that purpose.



ANGLES OF NORMAL FIGURE.

EXTREME POINT.

	N. L.	W. L.		N. L.	W. L.
Gulf of Kara . . .	67° 30'	67° 30'	Cape Yalmale (?)	72° 40'	70°
Cape Navarin . . .	62° 18'	178° 56'	East Cape (?)	66°	179° 50'
Singapore . . .	1° 17'	103° 50'			
Cape Babelmandel	12° 41'	43° 27'			
Dardanelles . . .	40° 9'	26° 24'			

As the other points coincide, this comparison will show how little the normal figure differs from the true development in its extreme limits. There is, however, a considerable difference between the extreme limits in latitude, as is apparent by the diagram, for to the north the mainland of Asia reaches 77° 20'. The main area of Asia has been already given (see table, page 205) as 16,683,260, or one-third of all the land on the surface of the globe.

4 *Of the Coast Line.*—The trending of the eastern coast is nearly north-east and south-west. On the coast of the southern peninsulas this is slightly

varied—in Arabia the direction being more easterly; but the coast of the Red Sea and Malabar have nearly an equal trending to the north-west. The coast of the Caspian has rather more northing, and the Oural Mountains run nearly north and south. This shows the gradual change in the direction of the slopes, losing their westerly tendency as they become more northerly in position, as is well shown on the coast of Asia Minor, which at its south-western extremity projects a full degree beyond the line of the normal figure drawn from the Straits of Babelmandel to the Dardanelles. It will be seen hereafter that the axis of the central watershed of the continent rises gradually to the north-west, as is especially observable in the chain of the Caucasus. It has been shown that the coast line of Asia is less indented than that of either Europe or North America. The most marked features in its outline are afforded by its vast promontorial or peninsular masses—Kamschatka, the Malay peninsula, Hindostan, Arabia, Asia Minor, to which may be added the extension of its secondary chains in the Islands of Japan, the Eastern Archipelago, and beyond them, of Australia and New Zealand.

According to the calculations given in the portion of this work devoted to physical geography, the proportion between the area and coast line would be 205. The former being estimated at 14,150,000 square miles—the latter at 28,500 linear miles.

The principal variations from the normal figure will be found as under:—

PROJECTIONS.		INDENTATIONS.	
Country of Tchutski on East	6°	Sea of Oekhotsk . . .	51°
Kamschatka . . . . .	5°	Leatong Gulf . . . . .	7°
The Korea . . . . .	3°	Gulf of Tonquin . . . . .	7°
South of Arabia . . . . .	2½°	Gulf of Siam . . . . .	8½°
Siberia . . . . .	3½°	Gulf of Martaban . . . . .	2½°
		Gulf of Perna . . . . .	11½°
		Levant . . . . .	4½°
		Caspian . . . . .	5°
		Gulf of Obi . . . . .	4°
		Borghai Bay . . . . .	4°

These are in a linear extension of 97° from N.E. to S.W., and of 72½° from N.W. to S.E., or 5820 and 4350 miles, of sixty to a degree, at the Equator respectively. It will be seen that the greater irregularities are on the eastern coast, which is also covered by the islands before named. They are all, of course, consequent on the extension of the mountain ranges and depressions between them.

It may be noted, that the extreme length from east to west—*i. e.*, from the Dardanelles to the south point of the Corea, is 75°, or 4560 miles; and from north to south, from Cape Severo, the north point of Siberia, to Singapore, 77° 8', or 4628 miles of 60 to a degree at the Equator, or 5212 and 5360 English miles respectively.

5 *Of the Watersheds of Asia.*—On the examination of an orographic map of Asia, it must be apparent that its mountain systems cannot be separated from those of Europe and Africa, but that these latter are dependant on the former; nevertheless, as those of Arabia, Palestine and Asia Minor with the Caucasus are, as it were, the intermediate links which unite the two smaller with the larger division of the Eastern Continent, the great mass of its mountain system may be well considered distinctly and apart from them.

The country lying to the north of the sources of the Indus and Ganges, which presents to the eye on every side the greatest mass of mountains in the world, is a fit centre from whence the massive radii which form the skeleton of the vast continent, extend on every side to the sea. These, however carefully laid down on orographic maps, can only be considered as suggestive sketches. The knowledge of the truth has yet to be arrived at, and probably will be found far vaster and more important than is even now supposed. This mass, extending over above 30° of longitude and 10° of latitude, is generally represented as con-

sisting of distinct chains, having their common origination in the knot between the Hindoo Koosh, and Himalaya, to the north-west of the Valley of Cashmere. The recent information afforded by Captain Strachey, and others, respecting this region, has, however, confirmed what some geographers, reasoning from analogy, had suspected—viz., that these distinct chains exist only on the map, and that the confused mass of towering rocks and glaciers has yet to assume in our minds regular form.

Thus far, however, has been made apparent, that the centre and most compact portion of it, situated in the locality already indicated, is not that in which the highest peaks are to be found; for although presenting many above 25,000 feet in height, none have yet been seen rivalling in elevation Kinchinjinga, Dhwalagiri, or Cumulari. Still, in this part the greater mass is to be found, and here must elevation also produce its greatest effect, the most elevated peaks being situated some distance to the eastward. Nor is this a singular instance. In Europe, Mont Blanc is situated some distance to the south and west of the central mass of the Alps, which must be sought around the summit of Mount Gothard. In North America, Mounts Brown and Hooker are esteemed the most elevated points near the centre, and they lie far to the north of the Sierra Nevada and mountains about the southern pass, where the centre of the mass is usually placed; while Mount St. Elias, of still greater elevation, lies near  $10^{\circ}$  further north. In South America, also, the same is true: for the Andes of Bolivia, or those of Quito, particularly the former, must certainly be esteemed the central masses of the system, while the highest summit, Acocangua, lies  $15^{\circ}$  to the south; and in Africa, if the newly discovered mountains, Kilimanjaro and Kenia, be the highest, then the central mass must be sought to the north, where the summits do not rise nearly to the same altitude; and no doubt this will be found under the parallel of  $10^{\circ}$  north latitude, forming the watershed of the eastern head waters of the Nile, as those more elevated peaks will be found to be the watersheds of the more eastern or White Nile; making good the account of the father of descriptive geography, the venerable Ptolemy; and indeed this rule is found in juxtaposition with another, for as the highest peaks are not in immediate proximity to the central mass of the system to which they belong, so they are in the proximity of some of the principal sources of the greater rivers. This is less apparently true in South America than in the other divisions of the continents; still sufficient evidence may be adduced, if necessary, to show that this is an exception to a general rule.

Assuming, then, the mountains to the north of the Valley of Cashmere to be the point of intersection of the principal axes of elevation of the eastern continent, we find diverging from thence four, sufficiently well defined, at nearly right angles to each other; or if the expression be preferred, two intersecting each other—viz., the great mass of the Himalaya on the east, the Hindoo Koosh to the west, the Bolor to the north, and the Sulemanie to the south, separating India—i. e., the Valleys of the Indus and Ganges from Mongolia on the east, and Iran from Turan on the west.

Speaking generally, these districts accord with great physical divisions of this continent. We have the plateaux of the Mongul, the valleys of Hindostan, the table lands of Persia, Arabia, and Asia Minor, and the steppes of the Caspian, the Oural and Siberia, lying beyond the secondary chains which buttress up on the north side the great plateau of Tarim, the Gobi or Shamo, the desert lying between them and the Himalayas; while both the primary and secondary seem to lose their distinctness and individuality in the irregular mountain districts of Mantchouria and China.

If from this general survey we proceed to more detailed and systematic description, we find a great central axis or primary watershed extending the entire length of the Old World, from west to east, varying in latitude from  $35^{\circ}$  to  $45^{\circ}$  north, having its most southern extension near its greatest mass, and its most northern at either extremity. If, however, the entire length of this watershed be considered, the primary mountains of Europe and Africa



must be esteemed as extensions from the main and principal axis on the west, as those of North West China and the Indian Archipelago must be also to the east.

The central mass from which all the mountain chains of Asia originate is, as has been stated, not only the highest, but the most extensive range of mountains known. Its recent surveyors speak of it, without hesitation, as extending from the plains of Hindostan to the desert of Gobi. "Neither the Koenlun nor the Himalaya, as marked on our maps, have any definite special existence as mountain chains, apart from the general elevated mass of Thibet. That rugged country, then, seems to form the summit of a great protuberance above the general level of the earth's surface, of which these two chains form the north and south faces."\* The plains on the south have not an elevation of more than 1200 feet, nor those to the north probably of more than 3000, above the level of the sea; thus illustrating most remarkably the opinion of Humboldt, that the bases of mountains have less extent than is usually supposed.

6 *Of Orographical Classification.*—In classifying, therefore, the orography of Asia, this must form the primary watershed, and the order will stand thus:—

<i>Primary Watersheds.</i>	<i>Secondary Watersheds.</i>	<i>Tertiary Watersheds.</i>
Himalaya.	The Vindyha and Aravalli and Western Ghauts.	The Eastern Ghauts.
Kuenlun, and its extensions to the N.W.	Cochin China, Fokein, and Assam hills.	The Mts. of Borinal.
Hindoo Koosh.	Yun ling and Peling.	Malacca.
Taurus.	Sih-hih-tih.	Hadramaut and Hejaz.
	Sulimian.	Libanus.
	Zagros.	Uarl.
	Tianshan.	Mts. of N.E. Siberia.
	Altai.	
	Anti Taurus.	

Of the mountains of China we know little. Probably the tertiary range appears in the Philippine Islands, as the termination of the secondary does in Formosa, Japan, and Kamschatka.

The most marked features of the orography of Asia is its linear extension, specially in rectangular forms; nevertheless, the Oural chain cannot be looked on as an extension of the Bolor, as it is by some geographers.

7 *Classification of Rivers.*—Of the primary rivers there are—

Ganges and Brahmaputra, with the Irrawady, of the valley of which the Bay of Bengal forms the extension.

Indus and Euphrates, having their extension in the Persian Gulf and Indo-Persian Sea.

Kisilermac, extending into the basin of the Black Sea; besides the smaller streams on the southern slope; the

Aras and Kour, extending into the Caspian Sea, from the west, or the Kizilouzan, from the south.

Amoo, or Oxus, forming the upper S.E. portion of the valley of Aral.

The river of Yarkhand, which, under various names, falls from the E. face of the Bolor, and is low in the lakes of the central plateaux of Asia.

Ynesie, having its sources in Lake Baikal, which again is fed by the Selenga, possibly by the Sena.

Amur, the extension of which is into the Sea of Okhotsk.

Hoangho and the Yangtsekiang, the valleys of which are prolonged into the Yellow Sea.

\* See Mr. Strachey's paper in 21st vol. *Royal Geographical Society's Journal*.

Mekiang, or Cambodia, extending into the gulf of the same name, and probably the Martaban.

Of primary rivers Asia has therefore more than all the rest of the world together; but inasmuch as the secondary chains to the south approach closely to the sea, the extension of these rivers is not so great—excepting in the cases of the Chinese and northern rivers—as is due either to the mass or elevation from which they derive their waters. The gulfs and seas surrounding the continent are to the E. and S.; the extension of its primary valleys generally to the W. and N.W.; they are represented by the basins of the Black Sea, the Caspian, and Lake Aral, as well as the great central area, whose rivers and lakes have yet to be distinctly traced, and which wants so little depression to open its communication with the secondary valleys to the north. In Persia, also, the stream of the Helmund, primary as to its source, is lost in Lake Zurrah, the ancient Scistan, and does not reach the sea.

Of the secondary rivers, there are, the Nerbudda, the Godaverey, the Kishna, and the Coleroon, in the Peninsula of India. In Persia and Arabia their place is supplied by torrents. The Jordan, and Alhazzi or Adonis, in Syria; the Sir Daria, the Obi, the Olensk, the Kolymas, the Anadir, in the north; the Le Ho, Pe Ko, Hong Kiang, and Tonquin river, in China; the Menam, in Siam.

Of tertiary rivers, Asia can be said to possess but few, and those unimportant; they must be looked for principally on its northern slope.

8 *Of Geological Formation.*—If, after a general review of the orography of Asia, the constituents of the surface be inquired after, assuming the general accuracy of De Boué's results, we find the primary schistose formations corresponding to the masses of the principal watersheds, and extending through Asia Minor, Armenia, Persia, Northern India, and passing from Thibet into China, Mantchouria, and along the coast of Kamschatka to Behring's Strait, forming also an immense mass in the centre of the continent, in the region of the Altai, and the extensions of Arabia, the peninsula of India, the Malay peninsula, and the Corea. To the south of the line of principal extension, the change is extremely rapid, the metamorphic and transition rocks appearing overlaid at once by tertiary deposits. These occupy a large portion of Persia and Armenia, of Syria and Arabia, and are found in China and Mantchouria. To the south of the Ganges, however, the secondary stratified formations appear clear and well defined, and on the summit of the Himalaya chain the stratified rocks appear plainly to the eye. Following the crystalline schists, Mr. Strachey says the Silurian beds rise to a height of 20,000 feet, and the palæozoic strata extend to about 9000 feet in thickness; farther north the oolitic beds rise to the same altitude, and give direction to the streams which flow from their watershed.

All the valleys are filled with tertiary deposits, the gradual elevation which has at length formed the rivers Indus and Ganges having placed some of them, as in the plain of Thibet, 15,000 feet above the sea, and in them are found fossil remains identical with those at the southern foot of the Himalayas, in the Siwalik range. Vast tertiary deposits are also found in the great central desert, the valley of the Obi, and surrounding the Caspian and Lake Aral, while they form the surface of the larger portion of Arabia and Persia. It may be remarked generally that the forms assumed by the mountains of Asia belong to those of stratified rocks, and this is especially the case to the south of the primary watershed, in Persia and the Ghauts. The rapid declivity of the Himalayas to the south is equalled only by that of the Andes. Tables of the extent of basins and other particulars relating to the principal rivers of Asia will be found in chap. v. *Physical Geography*, and in describing the water basins of Asia in order, such further particulars as are most essential, and within the limits of this work, will be inserted.

The most remarked depression in the eastern continent is that which forms the basin of the Mediterranean; this, however, must be connected with the Caspian and Lake Aral as well as the Black Sea,

perhaps the Red Sea; in any case as connecting Asia with Europe and Africa. This would be the most important and natural point at which to commence description if the whole eastern continent were to be considered at once. As, however, its divisions must, according to custom, be taken separately, this will more properly form the bond of union between them. It is better therefore to commence with the watersheds of the basins opening to the south and east of these, and as in most immediate proximity to the great central mass, those of the Indus and Ganges most naturally present themselves.

## CHAPTER III.

### OF THE INDUS AND GANGES.

1. The primary Watershed and Valley of Thibet.—2. The Sutlej and its affluents.—3. The Indus and its affluents.—4. The countries watered by it.—5. The river Loony and district of Cutch.—6. The sources of the Ganges and primary affluents.—7. The lower water-parting and secondary affluents.—8. The great plain of Hindostan.—9. The Brahmaputra and San Po.—10. The Delta of the Ganges.

*Of the primary Watershed and Valley of Thibet.*—The southern slope of the primary watershed falls rapidly from the line of its greatest elevation, but the two great rivers, the Indus and the Ganges, which flow from it, have their principal sources in valleys parallel to that line, and are found in the closest connexion, and interlacing as it were with each other between the meridian of  $77^{\circ}$  and  $82^{\circ}$  east longitude, lake Tso Mapham, or Manasarowar, the confluence of the highest sources of the Jumna, being in longitude  $81^{\circ} 30'$ ; and the elevated valley through which that river runs extending from west to east to the north of the principal sources of the Ganges; and, in like manner, the sources of the Indus and its tributary the Sutlej overlap each other, having their rise in close proximity to those of the Ganges and Jumna, and flowing through valleys of similar character from east to west. This at first singular characteristic will be found to obtain in most if not all primary rivers.

The mountains to the north and south of these valleys differ more in their culminations than in the general development of their masses. Mr. Strachey gives the height of Tisekailas to the north of Lake Manasarowar as 22,000 feet, and another immediately to the west as 20,500; of Gurla immediately to the south, 25,200. Of others to the north, however, we know but little; to the south we have several accurate measurements. The same authority gives the following, on the 80th meridian N.L.:—Nandadivi, one peak, 25,700, the other 24,400; about  $79^{\circ} 30'$ —Kamil, 25,000; about  $78^{\circ} 45'$ —Porgyul, 22,700. The elevation of passes which communicate between the sources of the Sutlej and affluents of the Ganges is respectively, on the south, with the Khali, Lankpya, 18,000, Metadhura, 17,800; with the sources of the Alakananda, Lakhur, 18,400; Balch, 17,700; Holi, 15,000; Manna, 18,760. The elevation of the Nilary Pass communicating with the Bhagirathi is not given. The name Thibet is commonly applied to the entire length of the mountain region, from the sources of the Indus to those of the Menam. This country is too little known for any general geographical description to be attempted. Such local particulars as are available will be given in their respective places: it may, however, be fairly questioned whether the name Thibet can be properly applied to so large a territory, for since it must consist of a vast number of irregular and almost isolated mountain valleys, it seems scarcely probable that the same name was originally extended to them all, but rather that Europeans, in their ignorance of its geography, applied that name to the whole country to the frontiers of China, under the supposition that it was a continuous, though perhaps irregular, plain, and that there were no mountains of any importance

to the north. The general character of its valleys may perhaps be obtained from considering that of the Sutlej.

2 *The Sutlej and its Affluents.*—The two rivers which united form the main stream of the Indus have both their rise in the same mountain chain, below their junction it has no affluents; it is, therefore, one of the few primary rivers which receive no accession from a secondary watershed. The dividing watershed between the sources of the Sutlej, and as may be concluded those of the Brahmaputra, is in about east longitude  $82^{\circ}$ , and must be of extreme elevation, as Lake Manasarowar is stated by Mr. Strachey to be 15,200 feet above the sea level. He speaks with rapture of the magnificent scenery of this lake, which must, however, be considerably diminished in comparison with many others by the want of vegetation; it is of circular shape, with rocky coasts, and may be about fifteen miles in diameter; a stream flows from it into the neighbouring Lake, Tao Lanak, or Rakas Tal, about five miles distant. This is of more irregular form, extending in greatest length from north to south, showing several islands in its southern extremity, where it spreads considerably to the east and west; it may be in its greatest length twenty miles, and in its greatest breadth at the south thirteen. From this lake flows the main stream of the Sutlej, taking a direction to the northward of west through one of the Thibetian valleys, where that characteristic commences, which is continued throughout the whole course of this river and the Indus into which it flows, viz. that while the banks are fertile the country at no great distance is arid and barren for want of water. The bottom of the valley, covered with alluvial soil to the depth of nearly 3000 feet, is cut into deep channels by the affluents of the river, which accumulates them in a tremendous ravine, the sides of which 'straight and almost as even as a railway cutting,' rise apparently like the sides of mountains, through which it rushes with the rapidity of a torrent. This valley is described as of about 120 miles in length by 60 in breadth, and with but little irregularity of surface. The elevation of the sources of the streams which fall into Lake Manasarowar cannot be less than 16,000 feet. After passing through the gorge which separates this valley from the southern slope of the mountain, its height to the north of Dablung is given as 8300; nearly half the fall of the entire course of the river is therefore obtained in this valley, and in a direct line of not more than 200 miles. The eastern portion of this valley, as it is the more elevated, so it is the more rugged and mountainous; from under the alluvial deposit the tertiary beds appear rising at the Rioti Pass to a height of 17,000 feet, beyond which the deposit extends. It is, therefore, clear that the whole of this valley at one time formed a great lake, or before it was elevated a portion of the sea.

It has been already remarked that the snow limit on these mountains rises higher to the south than the north; on that side, few of the mountain peaks, though rising to an elevation above 20,000 feet, are covered with perpetual snow, and this no doubt is to be accounted for by the want of aerial moisture, the clouds passing from the south being intercepted by the peaks on the spurs extending southward; but little snow therefore falls on the plain, and it can lie there but a short time, as not only sheep and goats, but the larger yak are fed without provision being laid up for them during the winter. At Lé, the capital of Ladak, it seldom exceeds an inch in depth; vegetation is, nevertheless, extremely scanty, and no doubt checked and stunted by the violence of the winds, which, in the afternoon, are a cause of dread and danger to the traveller; the nights, on the contrary, are still and calm.

To the north of the Sutlej, which is the most eastern branch of the Indus, the main source of that river has its rise under the name Singe Tsiu. The eastern fountains of this branch are found under the  $81^{\text{st}}$  meridian, and within a few miles of those of the Sutlej; passing far to the north and west, it encircles the other principal sources—viz., the Jelum, the Chenab, and the Rhavee, from which the country about the middle course of the river obtains the name Punjab, or five rivers.

The Sutlej issues from its upper valley by a depression of not more than 8500 feet in elevation; here it receives a considerable affluent, the Spiti, but the passes on either side connecting its waters with those of the neighbouring rivers rise to a much greater elevation, as the Keobrang, of 18,300 feet. The name of this river, derived from the word Sutoodra, hundred channelled, gives an accurate idea of the country through which its upper waters flow, in the narrow channels cut by them at the bottom of deep ravines. Below the range of the Himalayas, it receives the Beas, its principal affluent, also from the north, but before leaving the hills it is above 100 yards across, and above the junction of the Beas 700, and navigable for small vessels. The Sutlej may be said to receive the accession of the waters of the inferior sources of the Indus, before joining the main stream, which it does  $28^{\circ} 55'$  N.L., and  $70^{\circ} 28'$  E.L., 470 miles from the sea, after a course of about 1000 miles. The Sutlej is the Hesudrus of antiquity; the Beas, the Hyphasis. This river has its source in the Ritanka Pass, 13,200 feet above the sea; it has a course of above 200 miles, a breadth of above 700 yards, but is shallow, and generally fordable in summer. The Chenab, the ancient Acesines, is usually said to receive the waters of the Jhelum and Ravee, the Hydaspes and Hydraotes of the Greeks, before its union with the Sutlej,  $29^{\circ} 21'$  N.L.,  $71^{\circ} 6'$  E.L.; its course is about 700 miles; it is only navigable for rafts. The Jhelum, or Jailen, is, on the contrary, navigable nearly to the pass through which it emerges from the mountains, and for 70 miles in Cashmere, the valley of which it drains; its estimated course is 350 miles; it has a considerable affluent, the Kishengunga.

3 *The Indus and its Affluents.*—The Indus, or Sindhu—i.e., the Sea\*—has within the mountains a course of 120 miles; it has three affluents to the north, of which the Gartope is the principal, and one, the Cabool, immediately to the south of the mountains. This river rises at an elevation of 8400 feet above the sea, about  $34^{\circ} 21'$  N.L. and  $68^{\circ} 20'$  E.L.; it has a course of 320 miles, and is navigable for vessels of forty tons and upwards for 50 miles; it has several affluents, and the passes at its head-waters form the natural line of communication between the upper valley of the Indus and Persia. As stated above, the river of the Punjab, the Punjnad, joins the Indus 470 miles from its mouth; below this it has no affluent, but frequently anastomoses. The Delta commences in  $25^{\circ} 9'$  N.L.  $68^{\circ} 21'$  E.L. It enters the sea by five mouths; the tidal movement is perceptible in its waters 75 miles from the sea; the river is navigable to the junction of the Cabool, at which point, 940 miles from the sea, it is 1000 feet above the ocean, 800 feet in breadth, 60 in depth, and a current of six miles an hour in rapidity; in the level country below, its course is from two to three, and it then becomes encumbered with sandbanks and alluvial deposits, which render its navigation difficult, if not dangerous. The land in its immediate vicinity, and especially its Delta, is of the highest fertility, but fertility at any distance is the result of irrigation. This river was the limit of the actual knowledge of the ancient Greeks.

4 *The Countries watered by the Indus.*—Of the countries drained by the Indus and its affluents, the Valley of Cashmere claims the first notice. It lies between the Punjab on the south and Thibet on the north, and within  $33^{\circ} 15'$  and  $34^{\circ} 30'$  N.L., and  $73^{\circ} 40'$  and  $75^{\circ} 30'$  E.L.; its area is estimated at 4500 square miles. It is surrounded on all sides by mountains, and is approached by passes, some of which are at all times practicable. This valley is noted for its beauty and fertility; it is well watered, and has three lakes connected with the river Jailen; the largest of these, Lake Oolar, or Wuller, may be about fifteen miles in length, and is surrounded by forests. Lake Dal, which has become proverbial for its beauty, is about six miles long. Its climate

\* This is the commonly received etymology, but there is another which connects it with the mythology of the Hindoos in the worship of the moon goddess, and is consequently a link between them, the Ionians, Assyrians, and Egyptians; it seems, therefore, the more important and more likely to be perpetuated.

is temperate, and rain falls plentifully in the early part of the year; it is subject to earthquakes. It produces the fruits and flowers, the rose especially unrivalled, both of tropical and temperate climates; rice is the principal product, with the water nut, which is raised for food in immense quantities; wheat, melons, tobacco, and cotton grow luxuriantly, and vegetables are cultivated in gardens floating on the surface of the lakes. Basalt is found in its mountains; marble and limestone are common, but there are few minerals or metals.

To the west of Cashmere the Valley of the Indus is inclosed by mountains of primitive rocks, while to the south are secondary stratifications, abounding in fossil remains. The valleys of the affluents of the Indus, which together are known by the name of Ladak, extend over an area which has been roughly estimated at 30,000 square miles. They are narrow and precipitous, and, consequently, sterile. The climate is severe, but the industry of the inhabitants secures sufficient produce for their sustenance. This country is the centre of the manufacture of the shawls known as Cashmere. Minerals are abundant, especially iron and copper; it extends to that of Bultu or Bultisthan, the character of which is very similar; and the area of which may be estimated at 12,000 square miles. Here the Upper Indus passes through the Valley of Iskardoh, which is little more than a gorge, nineteen miles long, by six or seven wide, but commands the passage to the lower country. The Kohisthan, or mountain-land of the Afghans, forming the valley of the River Cabool, is of similar character, as is all the country above the plain to the south and east of the junction of the Cabool and Indus. This plain is buttressed up by the Jangheer or Salt range, which rises abruptly from the plain to above 2000 feet, and may have an average elevation of 800 feet above the sea. The hills consist principally of sandstone, and have an average breadth of about five miles. This portion of the Salt range extends from the mountains of Affganisthan to the Jhelum, and forms the natural limit of the Doabs or arid plains below. Both the upper and the lower are, however, included in the district of the Punjaub. The upper is extremely fertile, and cultivated to the base of the mountains, and in many parts covered with thick jungle. The lower, where irrigation is possible, is also abundantly fertile, but only a very small portion of its surface has been made accessible to water.

The plain of the Punjaub is divided into five doabs by the rivers which intersect it; and extending from the Sulieman Mountains to the Sutlej and Punjaub, forms a triangle, which may be estimated at about 350 miles from east to west, and 400 miles from north to south, in extreme length and breadth. By some, however, it is made to include Ladak, and its length therefore estimated at 600 miles. Its northern limit is more usually placed at the junction of the Cabool and Indus; and with that limit this district would, on a rough estimate, contain above 75,000 square miles. The soil is generally sandy, yet all kinds of fruits and grains are cultivated; the sugar-cane flourishes, as do opium, indigo, and tobacco. The extensive pasture grounds support large herds of buffaloes, horses, and camels. From the hills are procured gypsum and rock-salt in immense quantities, alum, sulphur, nitre; and they contain abundant supplies of coal. In summer the climate is excessively hot and dry; but the winter is cold, and often frosty. Hence the inhabitants and animal and vegetable productions are vigorous. As on the east the Punjaub communicates with the Valley of the Ganges, so on the west it commands the passes into Persia and Afghanistan. It is, therefore, in many respects, the most important portion of Asia south of the Himalayas, not only in its political, but in its commercial relations.

Below the Punjaub, is the territory of Scinde, which has been compared, and not inaptly, to the lower valley of the Nile, bounded by mountains on one side and a desert on the other. It requires only the industry of man to render it by irrigation of extreme fertility; but like the Euphrates, which it more nearly resembles in its character, it has not the fertilizing periodical

inundations, which give such importance to the river of Egypt. Its greatest length is nearly 400 miles, and its greatest breadth about 300: it may contain 60,000 square miles of surface. The upper part is the more fertile, approximating in character to the neighbouring district of the Punjab, and affording the same products. Much of the country has, however, become unproductive, having been converted into hunting grounds by its late masters the Ameeers. Wool is an important product, and a staple of manufacture. Wild animals abound, especially tigers, hyenas, wolves, and alligators. Climate excessively hot and dry. The Delta is covered with jungle and tall grass, and the deposit of the inundation is saline; yet the land in the immediate vicinity of the river is of high fertility. The Delta communicates directly with the Runn of Cutch. A portion of the waters of the river are anastomosing, and find their way through a lake formed by an earthquake in 1819; this during the inundation forms part of the Runn, which is an extensive salt marsh, formed at the same period, extending over an area of 7400 square miles.

5 *The District of Cutch and the River Loony.*—The district of Cutch, nearly an island, lies between the Runn and the Gulf of Cutch, which separates it from Gujerat. A chain of volcanic hills, called Lunkni Jubberl, stretches across it; and parallel to it, on the north, another, with a narrow valley between them; this, with the plain extending about twenty-five miles from the hills to the sea, affords the only cultivatable land in the district. Its soil is for the most part sterile; the products are principally dates, cotton, iron ore, and horses, a tract of land called the Bunnee, extending for forty miles along the shore of the Runn, and about seven miles wide, producing most luxuriant pasture. Its inhabitants, as might be expected from its position, are for the most part sailors. Cutch Gundava is a district of Beloochistan, lying between Lower Scinde and Affganisthan, not dissimilar in character from that of the Valley of the Indus generally; it is bounded on the north by the Gindaree Mountains; its area is estimated at 10,000 square miles.

The southern coast is formed by a high bank of sand, which extends from the Indus to the Gulf, and rises considerably above the level of the land behind it. At the eastern extremity of Cutch is the large island of Sauntulpoor, occupying nearly the entire entrance to the Runn, and leaving access to it by two narrow channels. There are two islands in the Runn, named Puchum and Kureer.

Cutch consists generally of secondary formations, sandstones, &c., interspersed with beds of iron and coal; basalt prevails in the volcanic range. The earthquake above alluded to raised a great embankment across the eastern branch of the Indus, now known as the Ullal bund, or God's dam. Though the vegetation of Cutch is scanty, animal life is abundant. The wild ass is peculiar to the Runn; pea fowl are numerous; insects are so numerous during the monsoon as to be a plague to the inhabitants. The climate is during the greater part of the year equal and temperate, but in midsummer it is excessively hot, and in midwinter ice is not uncommon; but little rain falls during the year.

The Gulf of Cutch receives the waters of the river Loony, and this river may very possibly at one time have been a secondary affluent of the Indus; but in this valley, as in that of the Euphrates, great changes have resulted from recent volcanic action. This is the only river which derives its waters from the western slope of the Aravalli hills, which separate the valley of the Indus from that of the Ganges; its sources are in the sacred lakes of Poolkur and Ajmeer, at the northern extremity of the Aravalli, and flows for 300 miles through Marwar; it has one affluent, the Jahu, which rises near Purbutsur, at the southern extremity of the same range. The Gulf of Cutch will, with other inlets of the sea, be described in the portion of this work devoted to Marine Hydrography.

6 *The Sources of the Ganges and Primary Affluents.*—The Ganges, the most important river of this portion of the Eastern Continent, as draining a

larger and more fertile country than any other, is usually said to rise from two principal sources, Bhagirath and Alakananda, in lat.  $31^{\circ}$  N., long.  $79^{\circ}$  E. The former, at Gangotri, from beneath a snow-covered glacier, 13,000 feet above the level of the sea; the latter at Badrinath, about twenty miles to the west. Captain Strachey's map, however, shows the Jahnani to be the primary source; this, extending to the north, round Gangotri, rises near Kedarnath, in immediate proximity to one source of the Alakananda. The Jahnani receives a tributary stream from the southern face of the Nilang pass, about ten miles below the village of Gangotri. The Bhagirathi flows in a southerly direction to Deopraga, where, joining the Alakananda, it forms the main stream of the Ganges. It receives a small tributary, the Bilangna, which has also its source near Kedarnath, at Tirhi; and as its primary source may be estimated at 15,000 feet in elevation, Tirhi as only 2300, and Deopraga as 1500, it must have a fall of 14,000 feet in about 150 miles; to describe the ravines through which its torrents rush is therefore unnecessary.

The principal sources of the Alakananda are in the southern faces of the Mana, Niti, and Balch passes; and as these are all about 17,000 feet high, they cannot have much less elevation than the sources of the Bhagirathi. One smaller tributary has its source near Nanda Aehri, on the western face of a pass which opens to the valley of the river Kali; while, from the southern slope of that mountain another and more important tributary, the Pindar, has its rise at Rudarpujag. The Mandakni, having its source at Kedarnath, joins it from the east, and here the elevation is about the same as at Tirhi. Below the junction of its two principal streams, the Ganges receives two smaller tributaries, the Nagar and the Dun, which rise in proximity to the sources of the Ramganga and Jumna respectively; from thence the river flows with a southerly course to Hurdwar, and then, bending to the east and south, continues that direction to the Bay of Bengal. Its course is above 1500 miles; below Hurdwar it is from 1 to  $1\frac{1}{2}$  mile in width; below Allahabad, often 3; at 500 miles from the sea it is 30 feet deep. It enters the sea by several mouths, which form the islands known as the Sunderbunds; at the eastern mouth the Brahmaputra unites with it, and its western, the Hooghly, is the entrance for sea-going vessels. The navigation is uninterrupted to the foot of the mountains.

The most important of the primary affluents of the Ganges is the Jumna, or Yamna—the Josnanes of Pliny. The main sources of this river are the Supin and Rupin, the former rising between those of the Bhagirathi and a tributary of the Sutlej. They are joined by the Pabar, which has its rise in the south slopes of the Barendra pass; their united waters form the Tons river, which unites with the Jumna at Kalsi, only 1700 feet above the level of the sea. This has its rise on the southern slopes of Jumnotri, which, like Gangotri, is one of the loftiest peaks of this portion of the Himalaya range, having an elevation of 25,500 feet. At Raighat, about 10 miles in direct line from their junction, another tributary unites with their waters, which has its sources in the mountains to the N.E. of Simla. A larger and more important affluent, the Hindan, has its rise in the lower range of the Himalaya, and, with a course nearly parallel, unites with it below Delhi.

The Jumna, receiving the first secondary affluent from the south, the Chumla may not improperly be considered the main stream of the river, although it receives, when united, the name Ganges. Its entire course is estimated at above 700 miles: it is shallow, and its navigation difficult; its breadth varies with the season, from 300 to 3000 feet. The Jumna joins the Ganges at Allahabad, and the district between the rivers is called, from its position, the Doab, as is usual to districts so situated, but the term is given to this without addition, *par excellence*, others, as in the Punjaub, having distinctive names given them.

The Ramganga, the next important primary affluent of the Ganges, rises in the lower range of the Himalaya, to the south of the main stream of the Alakananda and its affluent, the Nayar; it has a course of about 250 miles;



it receives from its left bank the waters of the Kosilla, or Kosi, the Khyllas, or Bhurgoo, and the Gurra, the latter not far from where it joins the Ganges at Canonge. Higher up, however, the Ramganga bifurcates and joins the Ganges near the mouths of two smaller affluents having their rise below the hills; the Ganges receives no other primary affluent till it joins the Jumna at Allahabad; below this the Goomtee, which draws its waters from the plain between the Ganges and its affluent the Sariou, adds its tribute to the main stream; it has also a considerable affluent from the right, the Sei. The next, and one of the most important primary affluents, is the Goggra, or Garghara; it is also called the Sariou, and is properly the Sareghu of Indian mythology. Its principal sources are in the Kali and Kalipare, or Dewa, the former having its rise from three principal heads—to the east, the Gori, on the south slope of the Untadfura pass, in close proximity to those of the Dhauli and Pindar; the centre, also called the Dhauli, on the southern slopes of the Nyne and Kach, passes, from the north slopes of which flow the affluents of the Sutlej; and that to the east, the Kali having two heads, one at the Lankpya pass, opposed to one principal source of the Sutlej, and the other from the Lipu pass, from the other slope of which flows one tributary of the Karnali, when their sources unite about 25 miles from the Lankpya pass the river has an elevation of above 13,000 feet; while at the junction of the Gori, 40 miles in direct line to the W., it is only 2000 feet above the sea, showing a fall of above 11,000 feet in about 65 miles. The sources of the Karnali overlap those of the Kali, rising a little to the east of the Lankpya pass, and in the mountains forming the southern portion of the basin of Lakes Rakastal and Manasarowa; this is evidently one of the principal sources of the main stream of the Ganges. Thirty-five miles in direct line from its most easterly source, the elevation given by Captain Strachey is 14,500 feet; it is probable, therefore, that its elevation at that source is not less than that of Lake Manasarowa, or above 15,000 feet. Five other affluents, the Charka, on the right, and the Rapti; and two smaller on the left, drawing their waters from the plain, join the Goggra before its junction with the main stream. The Rapti is an important river, having its sources in the hills to the south of Nepaul; its course is estimated at above 270 miles. Almost all these rivers bifurcate and connect their waters: the Goggra thus connects itself with the Ganges by the Sarjoo, and that again is connected with the upper waters of the Goggra by the Tonse; the little Gunduck also, the lower affluent of the Goggra, on the left, is in like manner connected with the Gunduck, which again is connected by bifurcations both with the lower course of the Goggra and with the Ganges. The Goggra has a course of above 500 miles.

The next important primary affluent of the Ganges is the Gunduck, which rises from two principal sources in the Valley of Nepaul, from the southern slope of the watershed of the Sanpo; that to the west, the Gunduck, or Salagra, are about lat.  $33^{\circ} 30'$ , and that to the east, the Bori Gunduck, or Triaul Gunga, in about  $35^{\circ} 50'$ . This latter also receives two important affluents from the north, the Naling and the Marachangdi. The importance of this river will be seen in the extent of country which it drains; its course is estimated at above 360 miles: it joins the main stream opposite Patnah.

The Coosy has also its principal source in Nepaul, the San Coosy rising from the opposite slope of the watershed of the Bori Gunduck, on which stands Katmandu, the capital of the district, and the Aruin, far to the north, from the southern slope of the mountains which form the Valley of the Sanpo. This river has one important affluent on the right, the Cumlah, whose numerous tributaries drain the lower range of the Nepaulese hills, as the Bogmuttee does the district intermediate between the Gunduck and the Coosy.

The remaining portion of the country between the Coosy and Brahmaputra is intersected by a network of canals and rivers which renders description impossible, and can only be made intelligible by a map. The Mahanudda and the Tecsta are the two most marked channels, the former having its sources in the lower range of hills, the latter in the valleys formed by the spurs of the highest mountain peaks in the world, Kufchinginja and Cumulari in

the district of Sikkim; the principal bifurcation connecting them is the Parnabubah, and the lower course of the Teesta is called the Attri, the Carattyal, and Issamuttee form channels connecting these waters with the lower course of the Ganges and the Labneo, a bifurcation of the Brahmaputra. To the south of the Mahanudda and Teesta, the Ganges forms the bifurcations Sooty, Jellinghy, and Mattabunga, which uniting above the town of that name, form its eastern mouth, the Hooghly; this receives from the west several tributaries, the principal of which are the Dummoodal, Dalkissor, and Cossa; bifurcations of the Mattabunga form the Issamot mouth, and others, the Cobbaduck, while others again, stretching further northward, form what is called the Ballisore river, which debouches on the Horingottah; this is again fed from the main stream of the Ganges.

The mountain region in which the primary affluents of the Ganges have their origin, are not dissimilar from those about the sources of the Indus; here are, however, the loftiest peaks of the Himalayas, the culminating points of the vertical contour of the earth's surface; many of these are above 20,000 feet high, six above 24,000 have been measured, and more than one exceed 28,000: they are generally met with about 80 or 90 miles from the southern axis of the main chain, and are grouped together in masses, from the sides of which radiate the gigantic ravines through which the sources of the great river of the south find their way to the plain. In tracing these ravines, approach may be made within ten miles of the snowy peaks without having reached a greater elevation than 4000 or 5000 feet; the more northerly of these sources are found about 25 miles to the north of these peaks, and probably, therefore, the mean elevation is there much greater. The valleys to the north are entirely barren, the moisture being intercepted by the mountain summits, while those to the south are clothed with magnificent forests. The main valleys open principally to the south; the lateral valleys have distinctive characters and vegetation on their opposite sides, owing to the different proportions of heat and moisture by which they are affected, the northern being fertile, the southern comparatively sterile.\*

At the foot of the mountains is a line of hills known as the Siwalik range, and between them a series of valleys called Duns; further to the east, in Nepal, they are termed Mari; these are about 2000 feet and upwards above the level of the sea. Below the Siwalik range a belt of forest extends, being in breadth about ten miles, and below this again, a belt of marsh land, covered with a thick growth of reeds; this is not the result of any depression of the surface, but most probably of the filtration of the surface drainage of the upper country through the sandy soil in which the minor streams flowing from the lower hills are absorbed, and which is covered by the forest above noticed. This swamp is, however, confined to the country to the east of the Ganges, where the level is generally lower than to the west; it is called the Tarai.

The transition from the Siwalik hills, or sub-Himalayan range, to the plain is very rapid; rising abruptly from it to an elevation varying from 3000 to 4000 feet, they are well defined along the whole line of the mountains.

The Siwalik hills are of tertiary formation; to the north of them is found a belt of sandstone, possibly secondary; to the north of the Duns, argillaceous schists, grits, and limestones; but, like the sandstones, apparently devoid of fossils. The intermediate valleys, or Duns, are covered with deposits of boulder and gravel. Fossiliferous rocks do not appear until the highest peaks are passed, and the whole area between them and the line of sandstone is filled with metamorphic rocks. Two lines of granite traverse this portion of the mountains coincident with the highest peaks, generally found in veins, the peaks themselves being most apparently of stratified rock; the other, to the south, is of a different mineral character, and appears to exercise no marked influence on the contour; eruptive greenstones are also found. The crystalline schists which accompany the northern line of granite are followed by slaty

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\* See Appendix C.

beds, both argillaceous and calcareous, on which rest strata of the silurian period; indications of Devonian and carboniferous strata have also been found, and beyond these, muschelkalk and oolite, which form the northern watershed. The palæozoic strata appear to be about 9000 feet in thickness, and, with the oolitic, rise to a height of 20,000 feet: they support, as already noticed, the tertiary deposits of the great valley of Thibet, which appear identical with those of the Siwalik range.\* Irruptive rocks occur in the vicinity of the lakes, and greenstone forms the summit at the pass of Balch, at an elevation of 17,600 feet.

In all parts of the mountains, covered with perpetual snow, glaciers abound, some of great magnitude.† The elevation of their extremities is from 11,500 to 12,000 feet. To the north, where the elevation of the snow line is the greatest, that of the extremities of the glaciers rises to 16,000 feet. The average motion of the glaciers may be about ten inches in twenty-four hours; and their ancient extension must have been very great beyond their present limits. To the south of the highest peaks, the limit of the snow line is 15,500, while to the north it rises to 19,000 or even 20,000; and, as already noticed, but small quantity of snow lies on the level of the Valley of Thibet, and none ever in summer.

Below 16,000 feet elevation tropical vegetation prevails to the height of 4000 feet on the face of these mountains; but the *pinus longifolia* often usurps the whole surface from 3000 to 6000 feet. From 4000 to 6000 feet, oaks and rhododendrons are numerous; and, from 6000 to 8000 feet, those trees, with *andromeda*, constitute the great mass of the forest. Above are found the deciduous trees of the temperate zone, mixed with pines, which prevail in the upper regions of forest, from 8000 to 11,000 feet. 'The arborescent grass (*arundinaria*) is, however, a marked and beautiful feature of the forest region to its extreme upper limit;' and the *camarops* palm is found at an elevation of 8000 feet, and growing to the height of 50 feet in places in winter covered with snow. The conditions required for this are heat and moisture, and these being abundant in the deep valleys of the rivers, tropical vegetation is carried in them into the centre of the mountains; and 'the traveller's eye rests on palms and acacias, intermingled with pines; on oaks and maples covered with epiphytal orchidæ; while pothos and clematis, bamboos and ivy, fill up the strangely-contrasted picture.'

The line of forest terminates suddenly at an elevation of about 11,500 feet. Above are found the mountain ash, rose, lilac, willow, juniper, &c., interspersed with a few scrubby and stunted trees. The *pinus decodar* seems confined to the western half of the Himalaya chain. The last tree met with is usually a birch, from the bark of which paper is made. The oak, horse-chestnut, walnut, elm, yew, and several maples are found in the forest belt; and below, within the belt of evergreens, the cypress, ash, birch, elm, holly, hornbeam and alder, with the laurel, all attain considerable size. The Alpine region above the forest is clothed with most luxuriant herbaceous vegetation; but the Thibetian valley is almost entirely divested of it. The limit of vegetable life varies from 17,000 to 19,000 feet. Wheat and barley are cultivated within the valleys at an elevation of 11,500 feet; but on the outer slope of the hills, this cultivation is seldom carried above 5000 feet, never above 8000 feet. A species of wild ass is found in Thibet. The Yak, the domestic animal of that country, is also found wild in secluded portions of the mountains. Two sorts of wild sheep are found, one of which appears identical with the Rocky Mountain sheep of North America. The hare, marmot, and mouse are not uncommon at elevations from 14,000 to 16,000 feet. The ounce, lynx, wolf, and fox are also met with in those regions. The raven, chough, hoopoe, bustard, goose, with ducks and teal in abundance, were found by Captain Strachey at elevations above 15,000 feet; vultures, eagles, and hawks, with herons, gulls, and tern about the lakes; the pigeon, dove, lark, wagtail, and other small birds, as well as the partridge.

\* See Captain Strachey's paper, vol. xxi., *Royal Geographical Society's Journal*.

† Dr. Hooker describes a wall of ice 4000 feet in perpendicular height.

The lakes and all, even the smaller, streams abound in fish.

7 *The Lower Waterparting and Secondary Affluents.*—The watershed between the Jumna and the Sutlej, immediately below the line of hills, is of scarcely perceptible elevation, the extreme height above the level of the sea not being more, probably, than 1200 feet. To the south, however, the limits of the respective valleys of the Loony and Chumbul are clearly defined by the range of the Aravalli Hills, at the western base of which extends the great desert, with its fringe of forest, which stretches from Ferozpoor to the Runn, a distance of about 450 English miles; its breadth varying from 50 to 100 miles. It lies on a basis of sandstone. The Aravalli range extends S.W. and N.E. for about 300 miles, rising abruptly from the desert toward the west, but descending more gradually to the east, throwing out spurs and tablelands for sixty miles from its main axis, and reaching towards Delhi and the banks of the Jumna. Indeed, the entire country between the Aravalli and the Vindhya range is known as the table-land of Malwa. The Aravalli rise to a mean height of 3500 feet, and are of primitive formation. Their summits consist of large masses of quartzose rock, and hard red sandstone is found at their western base. To the south they bend eastward round the sources of the small rivers Suburnulty and Mhye, and join the Vindhya range, which, stretching away to the eastward, forms the entire southern watershed of the secondary affluents of the Ganges. These mountains rise abruptly from the valley of the Nerbuddah on the south to an elevation of about 2500 feet, and form the southern buttresses of the table-land of Malwa, which may have an extreme elevation of 2000 feet, and slopes gradually to the north and east into the Valley of the Chumbul, which, with a N.E. course of about 500 miles, falls into the Jumna, eighty-five miles below Agra. Its affluents are the Sind and Nemij, which unite before reaching the main stream and the Parhuttee, both on the right bank. Below the Chumbul the Kohary, Bettwah, Sind, and Dessam are affluents of the Jumna. The Cane, with its three sources, the Sonar, Beernie, the Tonsa and its affluent the Boaker, which have their rise in the northern slope of the hills which form the Valley of the Sone, a more important affluent of the Jumna. This river, rising near the sources of the Nerbudda and Mahanuddy, receives several important affluents from the south, the Nurar, Kunker, and Coyle; although flowing through a hilly country, they are not of much use for purposes of commerce. The Sone, after a N.E. course of about 450 miles, flows into the Ganges, twenty-five miles west of Putnah. Near its mouth the Sone anastomoses; and the smaller affluents from the south, the Pangoon, Fulgo, and Dunnean bifurcate, and the country assumes a similar character to that on the opposite bank of the main stream.

8 *The Great Plain of Hindosthan.*—The great plain through which the Ganges and its tributaries flow extends from the debouche of the Indus to that of the Brahmaputra, prolonged to the south, on the one hand, to the Bay of Bengal, and on the other to the Arabian Sea—i.e., from the mouth of the Ganges to those of the Indus. Its area has been estimated at 500,000 square miles; but of this about 150,000 are occupied by the great desert already alluded to. The Valley of the Ganges and its tributaries is extremely fertile, and varies but little in its character or productions. The course of the main streams, the Jumna and Ganges, before their junction, being through the district of Delhi, naturally sultry and dry, but fertilized by canals constructed by the Mahomedans after their conquest. To the south, Gualior is of similar character, but intersected by mountain ranges, and the district of Malwah derives its name from its mountains, which are continued on the southern bank until the junction of the Sone. This district, a large portion of which consists of secondary sandstones overlaid with argillaceous limestones, is rich in precious stones, and contains the diamond mines of Punal. Here are also the Salt Lakes, Samber, which is twenty miles long, by one and a-half broad, the Deedwannah, and Sir; and the river Sursootee is lost in the sand, under which it is believed by the Hindoos to find its way to Allahabad. On the north, the district of Oude forms a fertile plain, yielding the richest produce

of grain, both wheat and rice, sugar, indigo, opium, &c., and this character is maintained through the districts of Allahabad and Bahar. The climate is more temperate, and, consequently, more healthy than that of Bengal, through which the lower course of the river is continued to the sea. The upper portion of the delta forms the district of Jessore, which is low, hot, and very fertile. Though much of its surface is still covered with jungle, it produces abundant crops of rice, sugar, hemp, mustard, indigo, tobacco, and turmeric. The lower portion of the delta is known as the Sunderbunds, a densely wooded tract, extending 170 miles along the coast of the Bay of Bengal. Here the annual deposit of mud is estimated at 6,000,000,000 cubic feet. In the dry season the main rate of the current is less than three miles, and in the rainy season not more than seven or eight; and, consequently, the principal mouths of the river are rendered inaccessible to large vessels by bars of sand and mud.

9 *The Sanpo and Brahmaputra*.—The Brahmaputra brings to the sea a far larger volume of water than the Ganges; for sixty miles above its confluence with that river, it has a regular width of from four to five miles; the estuary into which their united waters flow has a breadth of twenty miles; in lat.  $27^{\circ} 45' N.$  and long.  $95^{\circ} 25' E.$ , it receives the waters of the Dihong from the west, or rather the main stream comes from that direction and receives its tributary waters from the north and east, the Dihong having three times as large a volume of water as the Brahmaputra. Where this can be derived from, unless it be from the Sanpo of Thibet, it would be impossible to say, and in the absence of actual surveys it may be assumed as certainly the continuation of that river. Of the Sanpo little is known, but that it rises in immediate proximity to the main sources of the Sutlej and Ganges, and flows through an elevated valley similar to that of the former river, but in all probability of far greater extent and fertility. One of the sources of the Sanpo is in Lake Paltee, remarkable for its circular form and for containing a large island, which occupies the greater part of its area; the lake is forty miles in diameter. Breaking through the mountain barrier, from whence its upward course is unknown, it flows through Assam, receiving several important affluents, and here it anastomoses, and encloses several large islands, two of which are seventy-five and fifty miles in length respectively; in Assam it is said to receive more than sixty affluents, principally from the left; on the right, the Bonap flows from the slopes of the mountains through the district of Bohtan, as does the Gadala, which joins the main stream after it issues into the plain of Bengal; here it is 1200 yards wide and very rapid, from hence to the sea its course is 400 miles in length; as already noticed, a large bifurcation, the Jena, unites it with the Ganges. The entire course cannot be less than 1500 miles; it flows through jungle and marsh lands, is very inaccessible, and the rapidity of the current renders its navigation impracticable. It is more than probable that in its upper course it receives important affluents from the western slope of the watershed of the Chinese rivers; below Assam it bends round the hill district of the Garrows, and below receives the united waters of the Soormal and Barak, the principal rivers of further India. The latter has a course of above 300 miles, but very tortuous, is frequently 200 yards across, and has during the rains a depth of 30 to 40 feet; the former may extend above 200 miles. The further portion of this district, Cashar, is mountainous and well-wooded, abounds in limestone; the greater part remains still uncultivated; the plains are fertile and produce rice, cotton, and sugar. The district of Assam is also very fertile and well-wooded; the tea-plant grows wild here, and coal and iron abound; gold-dust, amber, and petroleum, are also found.

The district of Bohtan differs from the other sub-Himalayan regions in having its lower elevations but scantily covered with vegetation; it is rich in metals, especially iron and copper; it produces abundant supplies of timber and esculent vegetables, but of grain, insufficient for its inhabitants, who import from Bengal.

## CHAPTER IV.

THE SECONDARY WATERSHEDS AND RIVERS OF  
SOUTH-EAST ASIA.

1. The Gulf of Cambay and Gujerat. — 2. The Ghauts and the Deccan. — 3. The Secondary Watershed of the Brahmaputra and Yang-tse Kiang.

**T**HERE is more connexion between the secondary watersheds of India than is at first sight apparent. Of those to the east of the Brahmaputra we, indeed, know little, but of those to the west and south of the Ganges, a careful examination of a map will show that, however they may, for the convenience of arrangement or of division of the country, be separated, they in reality all diverge from the table-land of Malwah between the head waters of the Sone and the Chumbul, as from a centre, and that the Vindhya chain and the Western Ghauts are, together with the Aravalli chain, but one system, forming the secondary watershed of the great plain of Hindosthan, and by their extension to the south with the subordinate or tertiary system of the Eastern Ghauts forming the peninsula of India.

From the Rhamghur hills, which form the watershed of the Dumoody, an affluent of the Hooghly, to the Gulf of Cambay, the Vindhya chain is continuous to the south and west; it appears to throw out spurs, which form the valleys of the Mhye, Nerbudda, and Tapti, and then passing directly south becomes, to the north of Goa, the limit of the coast line. To the south below Seringapatam, the Neilgherry hills form the point of junction between the secondary and tertiary chains, which latter passing to the north-east, forms in the Eastern Ghauts the coast of Coromandel. The valleys which in their extension form the Gulf of Cambay, and naturally, therefore, appertain to the Valley of the Indus, claim our attention first.

1. *The Gulf of Cambay and Gujerat.* — The watershed of the three small rivers, the Bunnass, Surraswattee, and Sundramuttee, which fall into the north-east part of the Gulf of Cutch, is extended into the Peninsula of Gujerat, or, as it is also termed, of Kattiwar, which forms the western limit of the Gulf of Cambay, and divides it from the Gulf of Cutch. This district is about 150 miles in diameter, its surface diversified and watered with many streams, of which the principal are the Matchoo, falling into the neck of the Gulf of Cutch; the Bhandur, falling into the sea on the south-western coast; and the Setroonjee, which adds the tribute of its waters to the Gulf of Cambay.

The name Gujerat is not confined to the peninsula; in a political sense, it is now more properly applied to the coast of the gulf, and especially the embouchures of the rivers Nerbudda, Tapti, Mhye, and Sabermutty. The peninsula is separated from the main land on the east by extensive low marshy lands, which are continued round the coast. The Sabermutty river flows into the head of the gulf; it rises from two sources, the one near the head waters of the Burnass, the other near those of the Mhye; it has a course of about 150 miles in length, but is nearly dry during the hot season. The northern sources of the Mhye are found in close proximity to the western sources of the Chumbul, while its southern approximate as closely to the southern sources of the same river, having their rise in the northern slope of the watershed of the Nerbuddah; thus, while the two principal sources of the Mhye flow south-east and north-west, its main stream, after their junction, takes a south-west direction. The Anass, its principal tributary, flows from

the same watershed and parallel to its southern waters; this is the next important river of Gujerat to the Nerbuddah; it has a course of above 300 miles, and the inlet of the gulf into which it falls is above five miles in width; from the irregular course of the river, the varied character of the country which it drains may at once be concluded.

The Nerbuddah, or Narmada, Narmadus of the ancients, is next to the Indus the principal river of India, flowing into the Arabian Sea; its headwaters are found in immediate proximity to those of the Sone, Mahanuddy, and Godavery, and it extends for 620 miles, or about two-thirds of the distance across the entire peninsula; rushing with rapid torrent through a narrow valley, it receives no affluent of importance; it is 600 yards across at about 100 miles from its source, nearly double that width before it passes the line of the sources of the Mhye, and in parts three miles wide near its mouth; its navigation is impeded by cataracts, rocks, shoals, and islands. The north-west limit of its valley is formed by the precipitous escarpment of the Vindhya range; its southern by the more gradual northern slope of the Sautpoorah, which separates it from the valley of the Tapy, and must be considered an elongated spur of the Vindhya chain.

The Tapy rises in the centre of the peninsula near the head waters of the Godavery, from many sources, which combine to form two principal streams—the Tapy and Poorna, these unite about 150 miles in direct line from the main source, and continue their course to the sea under the former name for about 250 more. The valley of this river is more extensive in proportion to its length than that of the Nerbudda; and its affluents larger and more numerous. Several of these, of which the Boary is the principal, fall from the inner flank of a spur of the Ghauts which approaches the main stream about 100 miles from its mouth, and forms the amphitheatre in which their waters are collected. Their sources are found in close connexion with the extreme western source of the Godavery.

Below this river the Gunga and Gooria drain the coast district, which narrows gradually, and still lower the sea forms a deep inlet round the islands of Salsette and Bombay, and others of less note. The former is in length eighteen and in breadth thirteen miles; the latter eight by three; it is formed of two ranges of greenstone connected by sandstone strata; the sea is kept out of the valley between by an embankment. To the south of Bombay the sandy district of the Concan stretches in long narrow line at the foot of the Ghauts, for the most part covered with cocoa palms. The hills produce teak in abundance; cardamoms and pepper are cultivated for export, and sheep are fed for wool. Still further south, where the Ghauts approach more closely to the sea, the torrents Caidynuddy, Gungawally, and Sheravutty almost claim the rank of rivers; the former, also called the Carawotty, near Goa, is noted for the magnificent fall with which it descends from the hill.

The districts of Cochin and Travancore to the south are mountainous, fertile, and well watered; some of the small rivers have considerable inlets at their mouths, one at Cochin extends for fifty miles, and receives the waters of several rivers.

2 *The Ghauts and the Deccan.*—The Godavery and the Kishna drain the table-land of the Deccan, and their waters fall into the Bay of Bengal at little more than 100 miles distance from each other, while their extreme sources are 700 miles apart from north to south, and above 600 west from the coast of Coromandel. From this it will appear that what is usually termed the table-land of the Deccan is a congeries of valleys converging from north by west to south, and having their outlets by the channels of those rivers in a south-east direction, into the Bay of Bengal, the table-land being formed on the slope of the mountains extending round their head waters, and as far as the sources of the Mahanuddy.

These are the Vindhya range and its spurs, already described, to the north, and on the south the double chain of the Ghauts and the Neilgherry hills, by which they are united. The Western Ghauts, a word meaning a mountain

pass, and therefore incorrectly applied to these mountains, rise abruptly from the sea to the west at an average distance of thirty miles, as already noticed, but descending by terraces to the east form the valleys of the rivers flowing into the Bay of Bengal, and enclosing the greater part of the peninsula. The northern portion of this chain is less elevated than the southern, not exceeding for the most part 3000 feet in elevation. About the north-west sources of the Kistnah it assumes an average height of about 4500 feet, and about the south-west sources of the same river granite rocks rise 6000 feet in elevation; further south the lowest summits reach 5000 feet, and the Neilgherrys approach 9000.

The Eastern Ghats join the Neilgherrys on the south, and the Ramghur hills on the north. Their highest part is near Madras, reaching an elevation of 3000 feet. Beyond the valley of the southern affluents of the Cavery a mountainous coast stretches for 200 miles to Cape Comorin, covered with luxuriant forest vegetation, and terminating in a granite bluff 2000 feet high, from which a low ledge of rocks extends into the sea. This country is intersected by numerous lovely and fertile valleys.

Between the Western Ghats and the sea there is but a narrow slip of land, and the abrupt sides of the mountains are covered with vast forests of the finest teak, and dense jungles of rattan and bamboo. The slope of the Eastern Ghats to the sea has a different character; their summits are for the most part bare; their line is not continuous, and the land along the coast is low and of considerable breadth, forming alluvial plains of great fertility, along the shore of which the deposits from the rivers form a gradually shelving bank of upwards of 100 miles in breadth.

The Godavery, the more northern of these rivers, has, as already noticed, its sources in connexion with those of the Sonc, the Tapti, and the Nerbudda, by which it is overlapped, to the north; on the west its tributaries rise near the sources of the Mahanuddy. Its principal affluent on the north is the Wyne Gunga, which receives from the west the united waters of the Whurdah and Pain Gunga. The larger number of the affluents of the main stream are from the north-west, but before its junction with the Wyne Gunga it receives the waters of the Manjera from the south, the tortuous channel of which is but little separated from the north-west affluents of the Kishna. The course of this river is estimated as above 800 miles; its breadth in the rainy season is frequently one and a half miles, but in the Eastern Ghats at the pass of Papkoonda it is contracted to a quarter of a mile. It reaches the sea by two principal mouths, enclosing a delta of fifty miles in extent both on its base and from its apex; these are navigable for ships of large burden.

The Kistna or Krishna rises in the Western Ghats, within thirty miles of the sea, at an elevation of 4500 feet; it has a course of about 600 miles through a mountainous region, and receives several large affluents. The principal of these are the Toombuddery or Toongabuddra from the south, and the Beema from the north. One of the smaller affluents in the upper course of this river, before the junction of the Beema, is the Dhoun, the waters of which are salt. The northern head waters of this river are within forty miles of the sea coast, near Bombay, and the southern about fifty miles from Goa. It enters the sea by several mouths, anastomosing both to the right and left, but its delta is not as extensive as that of the Godavery, being not more than twenty miles from the apex, and extending about thirty along the coast, unless indeed it be considered to reach to Massulipatam, where some of its waters find their way to the sea by a narrow channel. The space intermediate between the Godavery and Kishnah is occupied by Lake Colair, and the anastomosing branches of the two rivers connecting with it. This lake is about forty-five miles long, and twelve broad, but this space is only covered with water for the three months of the rainy season, during which time the higher portions of ground form many small islands; during the rest of the year much of the soil, which is very fertile, is cultivated.

The Mahanuddy (the great river) though not so large as its name implies,



is still of considerable importance, since it is navigable 300 miles from its mouth, rising, as already noticed, in immediate proximity to the head water of the Sone, Nerbudda, and Godavery; it enters the Bay of Bengal by numerous mouths after a course of 500 miles; beyond it the Eastern Ghauts lose their identity, and are connected with the Rhamghur hills. It is during the dry season fordable at Cuttack seventy miles in direct line from its mouth; yet there it is during the rains two miles wide, and one mile, above 200 miles from the sea, where its course bends at right angles from south to east. The mouths of the Mahanuddy extend along the coast for above 100 miles, from the Bargoby river, near Juggernatha, to the northern mouth, which joins the sea in false bay; below Buddee, its stream anastomoses frequently, and its delta is apparently much larger in proportion to the size of the river than that of the Godavery or Kistnah. Its anastomosing branches to the north join with those of the Brammy, or Mypurra, and that river again with those of the Byturny Domrah, or Cayle, both of which rivers fall into the sea to the north of Cape Palmyras. To the north of these the Subunrecka, or Golden line, falls from the north-east slope of the Rhamghur hills to the sea, with a course of 250 miles, of which it is navigable for twenty; it has a great fall in its upper course.

Between the Mahanuddy and the Godavery the Polair, Cicacole and other smaller streams fall from the slope of the Ghauts into the Bay of Bengal, and form the tertiary waters of the peninsula; with these must be classed the Vellore to the south. In the same district is the Chilka Lake, properly to be classed among lagoons, being separated from the sea only by a narrow belt of sand; it is about thirty miles long, and more than ten broad. It was estimated to cover an area of near 800 square miles, but it is gradually decreasing in size; it has numerous inhabited islands, and great quantities of salt are produced from it.

The Pennar river drains the country, encircled by the Kistnah and the Cavery. It has a course of nearly 300 miles; it has numerous affluents on both banks, one of which, the last from the south, spreads into an extensive lake. Two smaller rivers to the south, the Polar and Punnair, may possibly be classed in the tertiary system. Pulicat Lake, an inlet of the sea rather than a lake, or even a lagoon, is about forty miles south of the mouth of the Pennar. It is in length about forty and in breadth about ten miles, and separated from the sea by a long narrow island.

The Cavery or Cauvery and its branches drain the southern and eastern slopes of the Neilgherry hills, and the Pennar and Urgel and its southern affluents occupy the valley between them and the hills which terminate the peninsula at Cape Comorin. The district which it drains, buttressed up by the Neilgherry hills, has an average elevation of 3000 feet above the sea, and its main sources have an additional elevation of 1000. Its principal affluents are the Henavutty, Shimsona, and Arkavutty from the north, rising in close proximity to the southern sources of the Kistnah, and the Cabanny, Paniang and Urgel from the south. In its upper course above the island of Sivanasamudra it forms two cataracts of 460 and 350 feet in height respectively; in its lower course, near Trichinopoly, it divides and forms the island of Serinham, and after a course of near 500 miles it falls into the sea through many mouths, forming a most extensive delta, which may be roughly estimated at seventy miles from apex to base, and near 100 in extension along the sea shore. Its northern mouth, the Coleroon, flows through higher land than the rest of the delta, and is supported by a massy dam. It is probable that this has resulted from the gradual deposit of the waters of the river, assisted by the labour of man, which has been bestowed on it in preference to the other mouths, the most southern of which join the sea to the west of Cape Calimere. This river, though not navigable for large vessels through a great part of its course, is more useful in irrigation than many apparently more important.

The rivers of Tinevelly to the south are small and comparatively unimportant. The surface of the country is diversified with small streams and

lakes; to the north it is fertile, but to the south sandy and covered partially with palms; rice and cotton are produced in the valleys, grain on the hills. The climate is equable, but rain falls in both monsoons, in consequence of its position between the Bay of Bengal and the ocean.

The island of Ceylon, which geographically must be considered a continuation of the peninsula, will be described, as well as the coasts and their inlets, together with the Indian Ocean.

The Deccan, so called from 'Dacchina,' i. e., the south, offers three distinct characteristics, that of the higher table lands about the sources of the rivers, producing grain of all sorts, with tobacco, limestone, marble, iron, and copper; in the district below, rice and cotton. To the south, in Mysore, which is more elevated than to the north, a great portion of the surface is pasture land, and European grain, drugs, and spices are raised. The coast district, which is the hottest in India, produces principally rice; to the north, however, in the Circars, there is much pasturage.

3 *The secondary watershed of the Brahmaputra and Yangtse Kiang.*—Of this we know less than of most other portions of the earth's surface. It appears, however, distinctly traceable in an easterly direction by the sources of the rivers from Assam to the north of the parallel of  $25^{\circ}$  N. lat. until it bends northward round the lower southern affluents of the great river of China, and approaches the sea in about latitude  $29^{\circ}$  N. Should the Latchou prove, as some suppose, a source of the Mykiang, and not, like the Petchou, of the Chinese river, this continuity would be broken, and it may be assumed as more probable, if not as certain, that the rivers of Burmah and Siam are secondary rivers, falling from its southern face. What little we know of this hill country to the west shows it to be rich in minerals and metals as well as precious stones, in timber and the vegetable products, but the narrow course of its streams, and the small number of affluents which they receive, show also very plainly that the greater part of its surface must be mountainous, rocky, and barren.

The most extensive valley to the south is that of the Irrawaddy, which flows through Burmah, on either side of which long narrow spurs stretch from the principal range to the sea. The coast district to the west of Burmah is low, hot, and very moist, its soil very fertile, and much covered with forests; its products spices, sugar, cotton, tobacco, betel, and indigo: the hills afford iron and other metals. Its rivers are the Chittagong and Nauf, the former being a mile wide, and navigable at its mouth. Lower down, in Arracan, the coast is swampy, much indented, and covered with islands. Its rivers, the Arracan, Urgan, Aeng, and Sandoway, are all partly navigable; the former, also called the Kirlandyne, has a course of 200 miles, and vessels of 250 tons enter its mouth. In addition to the products of the more northern, the portion of the coast is rich in timber and cattle, iron, coal, and naphtha. The island of Cheduba has an area of 300 square miles, and has similar products to the coast, as has also the island Ramree, which is fifty miles long by fifteen broad.

The river Irrawaddy rises from several sources in the southern slope of the secondary watershed of the Brahmaputra to the east of Assam; these form two principal branches, which unite more than 350 miles from its mouth; above this point the country soon becomes mountainous, and of the rivers which drain it little is known; for 800 miles the river is navigable during the rainy season, and may always be ascended as high as Ava by vessels of 200 tons. The course of this river is generally south, but about fifty miles north in direct line from the junction of its two principal streams, it bends at right angles to the east, and again to the south; at the eastern extremity of this portion of the river it receives a large affluent from the east, the Mogoning or Myunganny, which is the limit of navigation for sea-going vessels. It is navigable for canoes upwards of 200 miles further north. The main stream varies from one to four miles in breadth. The Delta commences about 120 miles from the sea, and its numerous mouths and anastomosing branches cover an area of about 10,000 square miles, and occupy the whole coast from Cape Negrais to the mouth of the Thalaian, i. e., the whole northern

shore of the Gulf of Martaban. The lower part of the course of this river is covered with teak, forest and jungle; further north the country becomes more open: rice is at present the principal serial product, but maize and wheat grow well, and all the productions common to India might be forced here. The forests furnish valuable woods and gums. Palms, the sugar cane, tobacco, cotton, and indigo, are indigenous.

The mountain region produces turpentine, limestone, and marble, precious stones, especially sapphires and rubies. Gold, silver, iron, copper, tin, lead, antimony, amber, petroleum, natron, nitre, salt, and coal. The petroleum wells on the banks of the Irrawaddy occupy an area of sixteen miles square. Among the quadrupeds common to this country are the tiger, leopard, elephant, rhinoceros, hog, deer, ox, buffalo, bear, otter. The upper portions of Burmah are said to be of primary formation, the secondary series occupies the district lying between  $18^{\circ}$  and  $22^{\circ}$  N. lat., below which the surface is alluvial. The climate varies with the soil and elevation, and in all respects this country may be considered a type of the districts south of the Himalayas and east of the Indus.

The Saluen Thawneng, or Thaliain, is also a noble river, navigable to a considerable distance from the sea, and flowing through a country similar to the valley of the Irrawaddy, but of it little is known. It is, probably, connected with that river by anastomosing branches and canals in the delta; it falls into the east angle of the Gulf of Martaban, so named from a town situated at its mouth. The Meinam is larger, and falling into the Gulf of Siam, has a well-defined watershed between it and the Saluen, which prolonged to the south and east forms the peninsula of Malacca. The name implies mother of waters, and the three principal mouths of this river admit large vessels, but of its upper course little is known, nor can more be said of the great river of Anam or Cambodia, the Menam Kong, which is, however, supposed to have a course of above 1300 miles through highly fertile country, rich in minerals and metals, and the delta of which extends above 150 miles, stretching into the sea above fifty miles beyond its present principal mouths. Cochin China, which lies on the outer slope of the east watershed of the Menam, is about 600 miles long, but does not exceed 150 in width; it consists of numerous transverse valleys, opening to the east, formed by spurs projecting from the main range of mountains; these are lofty, and approach the coast, which is consequently deeply indented. This country is to be noted for the beauty of its scenery, the salubrity of its climate, and the richness of its vegetable productions; it adds tea to the other products common to the mountainous districts already described.

To the north is the fertile alluvial plain of Tonquin, watered by the river of the same name, which has two principal sources, the Sang-Kai and Lisien-Kiang; other smaller rivers flow into the Gulf of Tonquin to the north and south; in this district rice is abundantly productive in the low lands, the products of the mountains being similar to those of the rest of the peninsula.

The mountain ranges dividing these rivers are estimated, probably on insufficient data, as from 3000 to 5000 feet in height; that which passes through the length of the Malay peninsula is there more elevated, rising to 6000, and although depressed to the south, Mount Ophir, a detached peak, is estimated at 5700 feet elevation. This peninsula extends through  $13^{\circ}$  of latitude, and varies in breadth from 60 to 170 miles. It is fertile, and its products similar to the other mountainous district already noticed; it abounds specially in spices, caoutchouc, resins, coffee, and sago. Gold and tin are its principal metals, and produced in considerable quantities. The eastern coast is thickly covered with islands; off its southern extremity is the great island of Sumatra, from the north-west point of which a range of volcanic islands is continued to the coast of Arracan, enclosing a portion of the Indian sea of the length of the peninsula, and about 350 miles wide, which communicates with the China sea by the Strait of Malacca.

## CHAPTER V.

## THE WATERSHEDS AND RIVERS OF EASTERN ASIA.

1. The primary watershed of Eastern Asia.—2. The great river of China.—3. The secondary watersheds.—4. Kwan Tung and Fokein.—5. Chang Tung, the Corea and countries bordering the Yellow Sea.—6. The river Amour and Mantchouria.

TO the north of the valley of the San-po the primary watershed of Asia appears to assume the character of a vast knot, surrounding a plateau from whence the ranges which form the limits of the valley of China diverge to the east, while the main range is continued along the edge of the Great Desert, until it joins the secondary range, which forms the northern limit of the Shamo, and passing round the sea of Okhotsk issues in the peninsula of Kamtschatka and towards Behring's Straits. Of this, in truth, very little is certainly known, and its general character may be, perhaps, best considered from the Chinese description of the district of Koh-ko-nor.

So far as an intelligible account can be given, it would appear that from the great mass of mountains to the north and west of the sources of the San-po, the great knot of Padisha, the main line continues to the north-east until it sends out spurs of considerable elevation between the sources of the Yangtse-Kiang and the Yellow river enclosing the district of Koh-ko-nor; the principal of these, under the name of Suieh-ling or snowy mountains, unites with the Yung-ling or cloudy mountains, which projecting south below the 30th parallel of latitude, gives that direction to the main sources of the Yangtse-Kiang, which bends round their southern extremity, and then following the impulse of the secondary chain takes a north-east direction to the sea, the intermediate mountains receiving various names of local significance.

To the south, four smaller ridges diverge from the same centre and run parallel, and within 100 miles of surface to the frontiers of Burmah. Another range passes away due east, forming the watershed between the Hoang-ho and Yangtse-Kiang, which is again nearly met by other ranges from the north-east, thus separating the upper, by well defined limits, from the middle and lower course of the rivers of China. Koh-ko-nor, the northern extremity of this central knot, is rough and most irregular in its character, mountain peaks rising from it far above the limit of eternal snow, a desolate region glistening with quartz crystals, and reflecting back the rays of the sun from its dazzling rocks and sand covered valleys. Its terrific character peoples it, in the imagination of the Chinese, "with Gorgons, Phantoms, and Chimeras dire." The eastern slope of these mountains is studded with lakes, the Koh-ko-nor, which gives its name to the district, is seventy miles long and forty broad; it is also called the Tsing-hai or Azure Sea, and was formerly considered the source of the Yangtse-Kiang.

2 *The Great River of China.*—The Yangtse-Kiang, Yangtzkiang, son of the ocean, or simply Kiang or Ta Kiang, the great river, used commonly to be called the Kiang Ku, i.e., the mouth of the river. The primary sources are probably about the 89th meridian east longitude, near the Tengkirinor in Thibet. From thence these streams unite to form the Murussu or Muhlusu, which is soon after joined by three other streams, the more northern of which have their sources in immediate proximity to the southern sources of the Hoang-ho; by some, the main streams before their union are called Ya-lung-Kiang and the Kucha-Kiang, but here both names and positions are uncertain; from the junction of the Ya-lung-Kiang, which is an important affluent, flowing for 600 miles from the north, its course is better known, but this is not improbably 1500 miles from its main sources. It bursts from the mountains in latitude 26°, and then turns to the

northward. Until its junction with the Ya-lung the main stream is called Kinsha-Kiang, gold sand river, afterwards the Ta Kiang; by the Chinese the Ya-lung is esteemed the more important. From its junction with the Yuen-Kiang it takes the name by which it is more generally known. It has several other large and important affluents, the names of which are differently represented; of these the Siang and Yuen fall into the Tunting Lake on the south, and thus unite with the main stream. This lake may be estimated at seventy miles in length by thirty in breadth, and 220 in circumference, many smaller lakes connect with this, covering an area of 200 miles long by eighty broad. The Kang-Kiang, also from the south, in the lower course of the river, flows through the Payang Lake, and continues the connexion of the provinces from north to south, effected between the great rivers by the Grand Canal. The Payang Lake is about 90 miles long by twenty broad, it is studded with beautiful islands, and from its trade and fisheries more important than Tunting Lake. Several other large lakes add their waters to the main stream, among which the Tai-hou or Great Lake on the south, and the Toan-hu on the north, are most worthy of notice; both these are connected with the river by navigable streams, and the former with the ocean by more than one channel. The Ha-Kiang and Kia-lin are the principal affluents on the north below the Ya-lung. These drain the country from the Peh-ling, the southern watershed of the Hoang-ho. The course of this river is variously estimated from 2500 to 3500 miles; the influence of the tide is felt to the junction of the waters of the Payang Lake, 450 miles from the ocean, beyond which it is navigable for 250 more, and ships of the largest class can ascend its waters 200 miles. Although the Yangtse-Kiang and the Hoang-ho are esteemed two distinct rivers, they are in reality as closely connected as the Ganges and Brahmaputra, to which indeed they have additional resemblance in the opposition of their character. The same delta is common to both as well as to the smaller stream of the Tsien-Tang-Kiang which flows into it from the south.

The Hoang or Hwang-ho, or Yellow River, rising in the Koh-ko-nor district, has one of its main sources in the Singsuh-hai, or sea of constellations, a marshy plain, on which a number of small lakes unite their waters in two larger ones, called Ala Nor. These are also named the Olin or Orin, and Dyaring or Tcharin, and lie about 150 miles to the south-west of the Koh-ko-nor, close to the sources of the Yangtse-Kiang as already noticed, in about 35° 40' north latitude, and 96° east longitude. This river has a very circuitous course, its direction is first south for thirty miles, then east for 160, then bending to the west through mountain gorges for 120, it takes a north-east direction for about 400 more, from whence its course is north for 430, when it is bent to the east for about 230, and finally to the south for 500 miles; and during 1130 miles of its course receives scarcely one stream of any considerable dimension. Here, in about 34° 30' north latitude and 110° 30' east longitude, it receives its most considerable affluent the Wei from the west, and here also its waters become tinged with the clay from the colour of which it derives its name. This river has a course of 400 miles, and is more navigable than the main stream.

From the junction of the Wei the course of the Yellow River is east and south for 650 miles to the sea, and at the head of its estuary the waters of Lake Hungtsih-hu unite with it; this lake receives the waters of the Hwai River. The Yellow River has fewer affluents than any large river, the Nile probably not excepted; two others, the Loo and the Fau, are alone worth naming. The Hwai drains the whole of the valley between the lower courses of the two great rivers, and may be considered one of the secondary rivers of this part of Asia. No two rivers can present more opposite characteristics than the two great rivers of China. The Yellow River is described as 'a mighty, impracticable, turbid, and furious stream;' the Yangtse-Kiang, in its lower course, uniform, deep, and steady, and navigable for boats for more than 1700 miles from its mouth, and the largest ships lie in ten fathom water, close to the rushes at Nanking. When near the ocean they approach within ninety miles

of each other, but their united delta extends along the coast nearly 250 miles, beyond, at the mouths of the estuaries, are several islands, of which Tchou-chan or Chusan and Tsang-min are large and important. The former is one of a group lying off the estuary of the Tsien-tang, is of irregular shape, mountainous, but fertile, and having rice swamps at the base of the hills; its circumference is estimated at fifty miles, Tsang-min is rather larger.

Of the country drained by these rivers in their upper courses little is known, our knowledge of China scarcely extending beyond the limit of the great plain, and for that we are for the most part indebted to Chinese accounts. This plain extends 700 miles from the great wall north of Peking to the confluence of the Han with the Yangtse-Kiang, from whence to the sea its southern boundary passes east nearly on parallel of  $30\frac{1}{2}^{\circ}$  N. lat. Its western limit is the eastern watershed of the Yellow River and sources of the Han, in about  $12\frac{1}{2}^{\circ}$  E. long.; its breadth varies, but north of latitude  $35^{\circ}$  an average of 200 miles may be fairly taken, and its area estimated as 70,000 square miles. In the line of the Yangtse-Kiang, however, it extends inland 400 miles, to the limit of the tidal water, and along the Yellow River about 300, and here its area cannot be less than 140,000 square miles, giving a total of above 200,000, or about the same area as the plain of Bengal.

The northern portion of the plain is dry and sandy, destitute of trees, but producing grain and vegetables in abundance. That lying near the coast is low and swampy, covered with lakes and intersected with watercourses; to the west it is varied by the contour of the watersheds. The climate of the different divisions of what is therefore, perhaps erroneously, called the great plain, varies extremely, the eastern portion being 'a marsh half drained,' and during summer excessively hot, is very prejudicial to the health of man, though favourable to the increase of vegetable productions. To the north, about Peking, the reverse is the case—dry and arid in summer, and suffering from severe frosts in winter; the average extreme temperature ranges from  $10^{\circ}$  to  $100^{\circ}$ , and the rivers are frozen from December to March. The hill country presents every possible variety of climate and temperature. Extending, as it does, through 20 degrees of latitude, with very mountainous surface, the average temperature of the whole of China is probably lower than that of any country situated between the same latitudes. At Canton, almost the southern limit, the thermometer ranges from  $29^{\circ}$  to  $94^{\circ}$ . Snow has been seen, and ice occasionally forms in shallow vessels.

3 *The Secondary Watersheds.*—Of the secondary watersheds of Eastern Asia very little is known. To the south, the Nan-ling mountains extend, under some fifty local names, from the Snowy Mountains, on the east, to the Chinese sea. The southern spur of this range, which passes round the north and east of the Gulf of Tonquin, and into the Island of Hainan, has in the latter some peaks approaching the snow line, and from this it may be concluded that its eastern and northern portions reach a very considerable elevation. The eastern extremity, the only part well known to Europeans, does not at the Mei-ling, or plum ridge, exceed 2000 feet, and the pass by which it is crossed has only 1000 feet elevation. It is formed of limestone overlying granite; on the main chain the peaks are limestone; but on the coast and in the islands igneous rocks predominate. Lead, iron, and coal, are abundant; its vegetable products are similar to those of the other mountain regions of this part of Asia. Of the northern secondary chains our only knowledge is obtained from Chinese maps and comparatively distant observations.

It has already been noticed that the primary mountain range of Eastern Asia extends round the Valley of the Amur, until it approaches the sea; here it is known as the Yablonoi Khrebet, and from it an important spur extends east between the head waters of the Amur and the great northern bend of the Hoang-ho. This is called the inner Hingan or Sialkoi range. Its northern extremities separate the Amur from its affluent the Songari. Of its height, climate, and productions, nothing certain is known, but that it is covered for the most part with forests. The northern and western watersheds

of the valleys of Mantchuria being thus formed, the eastern or secondary watershed follows nearly a direct line from the boundary of the Corea, in lat. 40° to the mouth of the Amur, in 52°; and here it is only separated from the spurs of the more northern by the comparatively narrow valley at the mouth of that river. This chain, called the *Sih-hih-tih*, passes close to the sea, with an average elevation of about 4500 feet, having but a narrow slip of cultivatable land. The connecting link between this secondary and the primary range is formed in the *Chang-peh-shan*, or Long White Mountains, which pass through *Leotung* to the north of *Pekin*, in about lat. 43°. One of its peaks, called *Pecha*, is estimated at 15,000 feet in height.

4 *Of Koang-tung and Fokien*.—The *Chu Kiang*, or Pearl River, which flows past *Canton*, unites in its estuary three rivers, respectively named from the direction of their sources, the West, North, and East Rivers. Of these the first two unite west of *Canton*, while the East river joins their waters at *Whampoa*. Of these the *Pe Kiang* and *Se Kiang* constitute more properly one river. The *Pe Kiang*, or North River, has a course of 200 miles, and may be considered an affluent of the *Se Kiang*, which has in its main stream a course of above 500 miles, and receives important affluents from the north and south. It is said to be navigable for above 200 miles. Most of the larger affluents are navigable for boats, and thus water communication is attained between all parts of the district. The delta of these rivers forms a triangle, which may be roughly estimated as 100 miles each way. The islands formed by the many mouths of the river are numerous and large. Among them is that of *Whampoa*, at the mouth of the East River, or *Tang Kiang*. This is about the same size as the *Pe Kiang*. Fifty miles below *Canton* and thirty below *Whampoa*, is the *Bogue* or *Bocca Tigris*, in *Chinese* *Fu Mun*, where the estuary unites with the inlet of the sea, at the mouth of which is situated the island of *Hong Kong*. The *Hang Kiang* is a small river to the east of the *Canton River*, with an important harbour at its mouth, on which is situate the city *Chian Chau Fou*. Among the more important products of the districts drained by these rivers are gold, silver, quicksilver, cassia and cabinet woods.

To the north, in the district of *Fokein*, *Min Kiang*, or the river *Min*, is likewise formed by the junction of three streams, two of which, from the north and south respectively, join the main stream at the foot of the mountain. The course of this river is, however, only known to Europeans for about seventy-five miles from its mouth, to which point it is navigable for large vessels, although its course is obstructed by rocks and shoals. The mountains approach very closely to the mouth of this river, and the whole surface of the country through which it flows is diversified with ranges of hills, yet the upper course is for the most part regular, and affords access by its waters to most parts of its valley. A large portion of the country is rocky and barren—much of the upper parts of the hills covered with pine trees; but it is, nevertheless, the principal tea district of China. The *Sung Kiang*, a river with a course of 200 miles to the south of the *Min Kiang*, flows into the Gulf of *Amoy*.

The irregular spurs of the secondary chain as they approach the sea form the valleys of small rivers and streams, which widen into gulfs and bays, and, in their extension, cover the coast with innumerable islands. The principal valley formed by the secondary rivers of the north-east is that of the *Pei-ho*, or White River. Of this little more is known than that it passes *Peking*, and receives several affluents. Its mouth is the northern terminus of the *Grand Canal*, which unites all the waters of the east coast of China. A bar at its mouth renders it inaccessible to large vessels. Its banks are flat and sterile; and in some parts of its lower course it is higher than the adjacent country. It drains the district of *Chili*, commonly called *Pechili*, in which are several lakes; the largest of which receives the waters of the *Hu-te* from the south, and is connected with the *Pei-ho*.

Granite and marble are abundant in this district; from which it may be assumed that its hills are of the same character as the secondary ranges to the

south. Precious stones are also found; nitre and China clay are abundant. The eastern extension of the secondary chains which form the north watershed of the main stream of the Hoang-ho, and from the reverse slope of which the waters of the Pei-ho are collected, presents some of the highest mountains in China, from the southern limit of the Gulf of Chili, or Pechili, and contracts the Yellow Sea to one half its width which it has to the south. The secondary watersheds already described to the north of the district form the northern limit of the Gulf of Liatong, and extend into the Corea. The former is a sterile and inhospitable region; the latter nearly surrounded by sea, more fertile and genial. It produces grain, tobacco, cotton, rice, fruits, timber, cattle, furs, gold, iron, rock-salt, and coal. It extends through ten degrees of latitude.

The Lia-ho, or Sira Muren, which drains the district of Liatong, and falls into the gulf of the same name, is a secondary river of considerable size, but, with the country through which it flows, unknown to Europeans. Its course has been estimated at 500 miles; its largest affluent is the Hoang-ho, which joins it from the north-west; between it and the Pei-ho, a small river, the Chantan, remarkable for the high temperature of its waters, flows into the gulf of Chili. The Yahung Kiang, a river with a course of 300 miles, falls into the Yellow Sea at its northern extremity.

6 *The River Amur and Mantchouria.*—To the north of the Long White Mountains lies the valley of the great southern affluent of the river Amur, the Songari, while the principal sources of that river are found far to the west of the Hingan, or Sialkoi range. Its irregular course is naturally divisible into four distinct portions,—the upper valley of its principal sources, its middle course and the valleys of its northern affluents, its lower course after the junction of the Songari and the valley of that river.

The Amur, Sagalien, Koangtung, or Hehlungtang—for it is known by all these names—has its principal source in about lat. 50° N., long. 110° E.; its embouchure is in lat. 53°, and long. 143° E.; its course is estimated at 2200 miles.

The names Sagalien-ula and Hehlung Kiang mean Black Dragon River, in Mantchu and Chinese respectively. Koangtung is the name given to its estuary; after it enters Mantchuria, its upper course being in Russian territory, it is called Amur, or Great River, by the people of that country. The spurs of the Hingan separate the two branches.

The principal source of this river, called the Onon, rises in a spur of the primary range called Kenteh, and after a course of about 500 miles, is joined by the Ingoda, a stream of about the same magnitude, rising in the east slope of the mountains which form the watershed of the tributaries of Lake Baikal, which uniting are known by the Russian name Chilka, or Shilka, and flowing 260 miles in a north-east direction, it receives the waters of the Argun from the south. The Chilka is considered the main stream, but the Argun is fully as large; it rises in the southern slope of the Kenteh, and after a short southern course, bends and flows for 430 miles, under the name Kerlow, to the north-east, receiving few tributaries till it reaches Lake Hurun, or Kulan, which also receives the waters of a large stream called the Kalka, which gives its name to the country, derives its waters from a lake of the same name in the Sealkai mountains, and flows through Lake Puyur, Bu-your, or Pir. The united waters of these streams, leaving Lake Hurun under the name Argun, have a northerly course of near 400 miles to their junction with the Chilka. Lake Hurun is about 200 miles in circumference; of the others nothing but the names are known. Below the junction of its two principal head waters, the river now called the Amur flows round the Sialkoi mountains and their north spurs, in an east and south-east direction, its course broken by rapids, through a narrow valley, as far south as lat. 47½°, when it is joined by its principal affluent, the Songari. In this course it has received one considerable affluent from the north, and several smaller from the north, south, and west, of which nothing is known.



The Songari river is formed from two principal sources; that on the south rises in the Long White Mountains, in about  $42^{\circ}$  north lat., and flows northward as far as lat.  $45^{\circ}$ , when it is joined by the Monni, a stream far more considerable in size and length. This has its rise in the north-east bend of the Sialkoi Mountain; and its western sources approach close to those of the Kalka and other eastern affluents of the Argun; it drains the elevated plateau to Teitrihar; and its course cannot be less than 400 miles in direct length. Lower down its course the Amur receives another considerable affluent from the south, the Ussiri, which flows from Lake Hinkai, or Kinka. This lake is about forty miles long, and not more than seventy distant from the Sea. In its lower course, just before its junction with the sea, the Amur receives a considerable affluent from the north-west, which drains the east portion of the country lying in the great bend of the river; its course from the junction of the Songari being north-east; this is named the Kenkon, possibly the same as the Hourda; but of all these rivers our information is very uncertain.

## CHAPTER VI.

### THE WATERSHEDS AND RIVERS OF THE NORTH.

1. The northern slope of the primary watershed.—2. The eastern basin of inland waters—the great desert Gobi, or Shamo.—3. The secondary watersheds and mountains of Mongolia.—4. The rivers of North-east Asia, and the peninsula of Kamtschatka.—5. Lake Baikal and the Ynesei.—6. The river Obi.

**THE Northern Slope of the Primary Watershed.**—From what has been already said any detailed description of the northern slope of the primary watershed of Asia will not be expected. It would appear to consist of several narrow valleys, of which that containing the waters of Lake Tenkiri is the largest, and sloping down to the great desert of Gobi, or Shamo, which has also a north-east slope from its western extremity, the Plateau of Tarim. As the position of the headwaters of the rivers is only known to a vague approximation, the exact limits or direction of the watershed cannot be stated. In all probability it commences its north-east trending from about the 90th meridian east long., forming the western watershed of the district of Koh-ko-nor, as already stated. No doubt, a large proportion of the mountain peaks included in it rise far above the level of perpetual snow, but we have as yet no means of ascertaining these elevations unless it might be by deduction from the computed elevation of the sources of the rivers, estimated from the rapidity of their currents—not, indeed, a very satisfactory method if minute accuracy was intended, but fully sufficient to satisfy any one, that as the watershed of the Brahmaputra, the Yantse-Kiang, and the Ho-ang-ho, they cannot be of very much less elevation than their neighbours to the south and west.

The Tengkiri-nor is situated in the midst of stupendous mountains, and receives the small river Tarku from the west: it has no outlet for its waters. To the north-east, between it and the Koh-ko-nor, there are several valleys, each containing similar lakes, varying in size, the majority of which are saline. Of this district little can be said, but that it is excessively dry, cold in winter, and hot in summer; its productions similar to those of the upper valleys of the Indus. The winter long—ice frequent in May; but corn grows during the short summer.

**2 Of the Eastern Basin of Inland Waters—the great Desert Gobi, or Shamo.**—Three distinct basins of inland waters, all, however, in close proximity to each other at the central mass of the primary watershed, are to be distinguished in Asia. The great area of depression of the Caspian and Lake Aral on the north-west, that of Lake Helmund on the south-west, and that of the

Great Desert on the north and east. There are other smaller undrained areas, as of Lake Van, and those on the west of China, already alluded to; but these are of marked importance. The eastern basin stretches through about  $45^{\circ}$  of longitude from the watershed between the rivers Sir Daria and Tarim, to that of the southern headwaters of the Amur. The general slope seems to be east and north, but its surface is probably divisible into several distinct valleys. Of these the principal is that of Lake Lob, which receives the waters of the river of Yarkand and Kashgar, the Tarim. The various streams which unite to form this river in its short course have their rise in, perhaps, the most elevated portion of the earth's surface. Their watersheds are the reverse slopes of those of the Sutlej, Amoo, and Sir Daria. The great Bolor chain is the limit to the west; the mountains forming the northern boundary; the valley of Thibet, already described from Captain Strachey's account, is its limit to the south; and on the north, a lofty range, little known, but at its western extremity, forming a mass, called Bogdo-ula, from which rise some of the highest peaks in Central Asia, and which is covered with glaciers. On the east this declines towards the general level, and here the volcanic peaks, Pe-shan Ho-tehou, and Solfat Urumtsi show that the influence, so powerful to the south and east of the continent, is not altogether wanting towards the centre.

The river Tarim, formed by the united streams of the Khoten, Kashgar, Yarkand, and Alisu or Aksu, after a course of about 1500 miles, falls into the Lob-nor or Lok-nor, commonly known as Lake Lob. A considerable affluent, the Kaidu, joins the Tarim, about eighty miles from its mouth. This has a course of about 200 miles, through a valley nearly parallel to the main stream. It flows through Lake Bostang, nearly as large as Lake Lob, which is estimated at about fifty miles long. The valley of this river is about 900 miles long, by 200 broad. It is represented by the Chinese, especially in the southern part, as producing, as do other parts of this country, grain and fruit, rice, tobacco, and cotton; horses, camels, the yak, and other horned cattle, are numerous; the lakes abound with game and fish; gold, copper, iron, saltpetre, sulphur, and asbestos, too, are found in the mountains. Jackals, tigers, bears, wolves, lynxes, and deer abound, as do birds of prey of the larger kinds. The climate is pleasant, and remarkable for its dryness, rain or snow seldom falling, the moisture of the clouds being intercepted by the lofty mountains which surround it. The jealousy of its governors, the Chinese, renders it inaccessible to foreigners, and it is little known. As the sources of the Amoo or Oxus are above 15,000 feet above the level of the sea, it may be assumed that those of the Tarim are not of less elevation; but as the latter river flows through a fertile valley, its fall cannot be so rapid; moreover, as Lake Baikal is nearly 1800 feet above the level of the sea, and as the eastern portion of the Gobi is estimated at 4000 feet and upwards in elevation, in the absence of accurate measurement it cannot be far wrong to give Lake Lob, an elevation of about 5000 feet. The region about Lake Lob is inhospitable, situated on the edge of the desert. It is surrounded by extensive swamps, which extend to the Kaidu, and probably to Lake Bostang. A considerable portion of the country, imperfectly drained by its southern affluents, is also marshy. This district is called by the Chinese *Thian-shan-nan-lou*, and that immediately to the north *Thian-shan-pe-lou*. This latter is more rugged and mountainous, divided into separate valleys by spurs from the main chain, the general direction of which is east and north. In these valleys are Lakes Toti and Balkash, and under the meridian,  $95^{\circ}$  east, a considerable depression occurs, in which Lake Dzaizang collects the headwaters of the river Irtysh, one of the principal feeders of the Obi. Around Lake Balkash the mountains rise above 10,000 feet; those separate it from the valley of Lake Toti, as do a similar range of less elevation from some smaller lakes to the south. If the elevation of Lake Dzaizang be estimated as equal to that of Lake Baikal, Lake Balkash may probably have a somewhat greater, and Lake Toti about the same elevation as

**Lake Lob.** The former, also, called Lake Tenghiz, is about 150 miles in length, and 75 miles in breadth. Of Lake Toti little is known. It is placed between long.  $77^{\circ}$  and  $81^{\circ}$  east, and lat.  $44^{\circ}$  and  $47^{\circ}$  north. An extensive marsh occupies the surface of the country immediately to the north. This lake receives the waters of the river Ili; but like Lake Lob, and so many others in the centre of Asia, has no outlet. This river is of the same name as the district through which it flows, which extends east into the Gobi; its course is about 300 miles. The area of its basin, and that of Lake Balkash, has been stated as 40,000 square miles. In this country coal is found.

The country to the north, known to the Chinese as Kob-do, is also little known, but seems to approximate most nearly to that of the Upper Irtysh, which immediately joins it. It has many small lakes, but these are, for the most part, of fresh water; and it appears to be more generally fertile than the neighbouring districts to the south. It is also probably warmer, as the slope from the Gobi to the Russian territories is known to be.

The great desert, called by the natives Gobi, or Shamo, occupies an area of 1000 miles in length, by 500 in breadth. It appears to be a continuation of the slope of the table-lands from north-east and south-west, having its own gradual declension to the north; its principal outlets by Lakes Dzaizang and Baikal; and its elevation from 2500 to 4000 feet. It differs little from the steppes of north-west Asia—consists of a barren, treeless, arid waste of shifting sands, which give an undulating contour to its surface.

3 *Of the Secondary Mountains of Mongolia.*—From the volcanic range of the Bodhka or Bogdo Ula, already noticed, the secondary mountains of Central Asia pass in irregular and broken lines to the north-west of the great desert round the sources of the Obi, Ynesei, and Lena, when they again join the primary chains to the north of Mantchouria, enclosing the basin of inland waters above described, which may be said to take a semi-lunar shape, having its diameter from north-east to south-west. Among the variety of names Russian, Mongol, and Chinese, given to these ranges, it is difficult to make selections, nor indeed would mere names be of any use; generally the whole have been denominated the Altai; to the north-east the Ala-shan and In-shan divide the desert from the Koh-ko-nor and basin of the Saghalien; others are termed Tangun Khangai and Kenteh; these form the junction with the main chain to the north, and extend south and west to long.  $90^{\circ}$ ; beyond these the Saratau reaches the main depressions near Lake Dzaizang, and is continued on the other side to the south-west on the Alatau and the other chains which connect with the primary watershed to the west. These latter rise with an elevation of from 7500 to above 10,000 feet in height, in the centre peaks rise above 11,000 feet, and to the north-east at Chikonda, at one source of the Amur, an elevation of above 8000 feet is given; a general average elevation of 10,000 might, therefore, be fairly assumed. The pass between the head waters of the rivers Saghalien and Tola, which flows into Lake Baikal, may have an elevation of from 4500 to 5000 feet, and immediately to the north-east of this is the mountain knot of Kenteh, from which the spurs in this district appear to diverge. As in the south on the primary chain, so here to the north in the secondary, the main sources of the rivers flow through lateral valleys, among which the spurs stretch, having a general elevation of from 3500 to 4500 feet. These mountains do not for the most part rise in peaks, but present level plains of considerable extent at the top, with valleys through which the rivers flow, fertile and fit for agricultural purposes. The terraces on the sides of the mountains afford pasturage for cattle. They are rich in metals and minerals, gold, silver, lead, onyx, topaz, amethyst, and other precious stones. Sandstones, conglomerates, and chalk, rest on the granites which crop out at the summits. The sands of this range are auriferous.

4 *The Rivers of North-East Asia and the Peninsula of Kamtschatka.*—The river Lena may in respect of its eastern sources be considered a primary river: it has, however, its main source in the secondary chains to the west of

**Lake Baikal.** Its anomalous character in this respect accords with that of the mountains, since about its eastern headwaters the secondary chains unite with the primary, and form one, which passing round the sources of the Indigirka and Kolyma, throws out spurs to the north and south, enclosing their valleys, and forming the peninsula of Kamtschatka, and is continued to the north-east extremity of the great continent, re-appearing again in the primary mountains of America, on the other side of Behring's Strait. Of this chain we may be said to know nothing but its general direction, yet as the mountains of Kamtschatka are estimated at an average elevation of 2000 feet, it may probably have a general elevation of from 3000 to 5000. It will be noticed hereafter how the volcanic range of the peninsula is continued to the east through the Aleutian Islands, and to the south through Japan, and it may be therefore considered as the connecting link of the secondary and tertiary mountains of the east of Asia.

Kamtschatka forms the north-east limit of the Gulf of Okhotsk, as the island of Saghalien at the mouth of the Amur or Saghalien is the south-west; its length is about 400 and its breadth 170 miles; at its southern extremity detached volcanic mountains, some of which rise above 11,000 feet, are scattered; as they are along its deeply indented eastern coast. The longer slope of the watershed is towards the east, and from it a river of the same name as the peninsula, having its principal affluent, the Yelowka, from the north, flows with a course of 250 miles; near its southern point is a lake, the Kurile, twenty miles long by twelve broad.

The climate of this peninsula is severe, the winter lasting nine months, and frosts being common in summer; consequently even in the sheltered valley of the Kamtschatka river only the hardier sorts of grain will grow, and of trees the larch; but the hills are rich in fur-producing animals, and probably in minerals and metals. Not dissimilar but more sterile is the country about the Anadyr river, which flows into the gulf of the same name, after a course of about 450 miles; but of the country it drains little is known, still less of the Tchaoun, which falls from the north slope of the same watershed into the Arctic Ocean.

Even on the Kolyma vegetation is confined to grasses and stunted willows. In the valley of the Indigirka the cold is even more severe and the country more sterile, while on the Lena the district of lowest temperature is found. The Kolyma has several sources, a course of about 700 miles, and an estuary of considerable breadth.

The principal source of the Lena is to the west of Lake Baikal; it flows first north-east, and then bending to the north receives its principal affluent, the Aldan; from the north-west slope of the primary watershed it flows into the Arctic Ocean through numerous mouths, after a course estimated at about 2500 miles, 800 miles from the ocean; it is from five to six miles in width, near the intersection of the 120th meridian, east long., and 60th parallel of north lat.; the elevation of Olekminsk is given as 400 feet, and lower down, at Yakutsk, long.  $129^{\circ} 44'$ , lat.  $62^{\circ}$ , only 288, which cannot be less than 700 miles in direct line from the ocean, giving a fall to the country through which it flows of only five inches per mile in its lower course; and while that through which its middle course flows cannot have more than eight, assuming 2400 miles as its length, and 2000 feet as the elevation of its main source to the west of Lake Baikal, the Lena throughout its entire course would have an average fall of ten inches only to a mile: but it must be remembered that this estimate relates to its lower sources; of those in the primary chain of the Yablonoi Kreet, or of the Vitima to the north-east of Lake Baikal, we know nothing but that they must be considerably higher. The Vitima is the name usually given to its main source; and two large affluents, the Talbatchin and Olekmah, join it below Olekminsk.

To the west of the Lena several small rivers flow into the sea from the north slope of the watersheds of the lower affluents of that river and the Yncsei. Of these as of some of the affluents of the larger rivers scarcely the names are

ascertained with any certainty ; from east to west they have been thus given, in the Olonek or Olensk, Olen, Anabara, Khatanga, and Piastla, or Piasina.

5 *Lake Baikal and the Ynesei*.—The river Ynesei has already been said to have its main source in Lake Baikal, which receives the waters of the Selinga, a river which has several sources in the valleys formed by the spurs to the east, north, and west of the mountain knot of Kentch, its south-west source, the Tola, being in close proximity to that of the north stream of the Saghalien or Amur. The Ynesei in this respect, therefore, may lay some claim to be considered a primary river, but as all its other sources have distinct relation to the secondary watersheds, exception can scarcely be taken to its classification among secondary rivers on this account.

The Selinga has a tortuous course of 700 miles, and besides that river Lake Baikal receives the waters of the Upper Angara at its north-east extremity, and the Bargusin from the east. These rivers are said to have respectively courses of 450 and 300 miles.

Lake Baikal has been described as an extension of the basin of the Upper Angara; for this there appears little reason except that its length is from north-east to south-west; the general fall of the country, and of the course of the main streams is, however, from south and east to west and north, and the Lower Angara, by which its surplus waters are carried into the Ynesei, being near its south-west extremity, its irregular crescent-shaped basin may be more properly considered as the result of the prolongation and union of the valleys of the three rivers which supply its waters.

This lake is held in respectful admiration both by the Russians and natives. Its name, properly Bayakal, means, in the Yakutsk language—the rich water. Its length is estimated at nearly 400 miles; its breadth from 25 to 50; its circumference about 1200, and its area 15,000 square miles; its height above the sea from 1419 to 1793 feet; the depth of its waters varies from 20 to 200 fathoms, and in the centre is not known; it contains many islands; these are like its shores rocky and precipitous; the largest, named Olkon, is stated to be thirty-two miles long and ten broad. In the waters of Lake Baikal bituminous matter is found; seals and herrings are caught there, though they are not known to ascend the Ynesei; the sturgeon fishery is important, as is that of a fish called by the Russians Golcomanka or Soliamanka. This lake freezes in November, and thaws in May; its surface is subject to violent agitation, and as in the case of other remote and comparatively unknown waters rendered sacred by the solitude and sublimity of their position, fabulous causes are said to produce these effects: as, however, the surface of the ground to the north-west of the lake from the Altai to the junction of the two principal sources of the Lena, across those of the Ynesei, is in process of elevation, it is not improbable that the subterraneous action which is producing that effect may have occasionally caused perturbations in the waters of the lake.

The Lower Angara flows from Lake Baikal through a narrow and precipitous valley. The district of Udinsk, which it drains, has a surface composed alternately of sand and rock, producing nothing but moss and small plants besides the stunted forest which covers its north-west portion. The fall of the country here must be considerable; the main source of the Selinga cannot be less than 5000 feet in elevation; the pass by which its waters descend from the mountain is above 4000; the point at which the several sources of that river unite may be estimated at above 2000, and of Irkutsk, thirty miles to the north of the effluence of the Lower Angara, the estimated elevation is 1330 feet, which agrees better with the lower than the higher estimate of the elevation of the surface of the lake itself. The fall of the Selinga may, therefore, be roughly stated as six feet in a mile. The length of the Ynesei is probably underrated; assuming, however, 2800 for its extreme course, or about 2200 from Lake Baikal to the sea, the fall through that distance would not differ greatly from the estimate made for the secondary affluents of the river Lena, or eight inches to a mile. After leaving the lake the

Angara soon changes its name to that of Tunguska; it receives two affluents of the same name, distinguished as the Lower and the Podkamenaia Tongouska, or Tunguska beyond the rocks; these rise from the west slope of the watershed of the Lena, and join the other principal source, which flows from the valleys of the Altai to the west of Lake Baikal; at Ynesisk, in lat.  $58^{\circ}$ , the river is 3600 feet wide, its stream deep and rapid; its estuary is thirty miles in breadth, and contains many islands. The district about the secondary sources of this river is extremely rich, producing heavy crops of grain for several successive years, as does also the country about those of the Lena; the sand of the mountains is rich in auriferous deposit, but the lower course of the river is through a level country; in summer a waste of marsh and lakes, in winter a frozen desert. The valleys of the Altai and of the knot of Kentch confined between walls of rock, offer extraordinary varieties of climate; that at the foot of the mountain is milder than might be expected, but at Irkutsk too cold for the cultivation of fruits; a large portion of that district is covered with forests.

6 *The River Obi*.—This, like the two other great rivers of North Asia, is formed by the junction of two principal streams. Of these the Obi, or eastern, has several sources on the Altai mountains, one of which flows through Lake Teletskoi or Altun-nor, after receiving the Tom and Choulin, its principal affluents from the right, it flows in a north and west course till its junction with the Irtschi, a stream by some estimated as the larger and more important of the two, and which has its main sources in the waters which fall into Lake Dzaizang. This lake, which is eighty miles long and twenty broad, is, as already noticed, situated to the north of a spur of the Tianshan mountains, which rise from 7000 to 10,000 feet above the sea. The elevation of its surface might, therefore, possibly be assumed as greater than that of Lake Baikal; but at about 150 miles in a direct line from its north shores the elevation is only stated as 844 feet, and 100 miles lower 755, so that it is improbable that the elevation of the surface of Lake Dzaizang should be greater than the lower estimate for that of Lake Baikal, or about 1400 feet. Yet if 1700 be the correct elevation of the surface of Lake Altun, that of Lake Dzaizang must be considerably greater, for at about seventy miles from that lake the elevation given is only 703 feet, while the sources of the Tom are given as 990; these apparent discrepancies cannot be reconciled without more numerous and accurate observations. The Irtsch receives two principal affluents from the left, the Ischim, which has its sources in the hills to the north of Lake Aral, and the Tobol, which rises from several streams on the east slope of the Oural mountains, and from a chain of lakes between its main stream and the Ischim. The sources of the Tobol are not less probably than 3500 feet in elevation, but at Tobolsk, where it joins the Irtsch, the elevation is only 115 feet; its direct course is 600 miles, and the general slope of its watershed about six feet in a mile. The entire length of the Obi is estimated at 2000 miles, less, probably, than the truth; the size of its affluents, however, makes the area it drains greater than that of the Ynesi.

Between the Obi and the Ischim, in the district of Baraba, are numerous lakes, among the more important of which are Lake Tshamy, eighty miles long by fifty broad, and Lake Yamish, which though only about seven miles in circumference is famous as producing salt of extreme whiteness, crystallizing in cakes. Lake Eilshi, or Bielshi, also produces abundance of salt.

The entire country drained by these rivers, from Behring's Strait to the Ural mountains, is known as Siberia, Sibiri or Asiatic Russia; the area may be roughly estimated as containing five millions and a half square miles of surface. A very large proportion of this has the subsoil constantly frozen; to the north of Irkutsk the soil always remains frozen to the depth of twelve or fifteen feet, at Yakutsk to twenty-seven, at Bogoslovsk, lat.  $59^{\circ} 44'$ , near the Urals to six.\* The warmest part of Siberia is the upper course of the Ynesi, in the valley to the west of Lake Baikal, and at Irkutsk "the country" is said

\* *Physical Geography*, p. 213.

to be "agreeable, the soil fertile, and agriculture flourishing." At Tobolsk there is no ground ice, but the line of its limit reaches further southward, as it is extended towards the east; 70° below zero have been experienced on the Lena; in the summer the temperature rises the same number of degrees above; but even when the stunted vegetation shows signs of life beneath the warmth of summer, a northern blast will cover it with a thin coating of ice, destroy the blossom and blight the leaf. At Okhotsk no ice is found, and the shores of the Pacific, protected by mountains to the north, are considerably warmer. In summer, in the regions of ground ice, the soil is thawed to a depth varying from one to three feet.

The vegetable life of Siberia is, however, not so scanty as these facts would suggest. The lime tree and ash cease, indeed, at the Irtysh, and the pine does not reach a higher latitude there than 60°, 10° lower than in Europe; the gooseberry, which grows in Greenland, only reaches 66° on the Ynesai; at 60°, potatoes do not grow larger than pease; yet the banks of the rivers in their middle and upper courses are skirted by dense forests of alder, willow, elm, maple, poplar, aspen, with numerous species of pine, of which the Siberian cedar, as far as the Ynesai, often reaches 120 feet in height, the balsam poplar perfumes the air, and the crab, cherry, and several fruit bearing under-shrubs, supply acid juices grateful in summer. The similarity of this district to that of Northern America will be hereafter noticed; 60° in the west and 55° in the east, appear to be the average northern limit of the growth of grain on the Obi, but under the 112th meridian it reaches three or four degrees further, flax 66°, hemp 55°. On the plains rein-deer, elk, wild dog, fur producing animals, and water-fowl, are indigenous; of the former and latter there is abundance, and Siberia is next to North America the most productive hunting ground for the fur trader in quantity, the best in respect of quality. In the mountain districts the animals of the south and north meet and intermingle. The tiger has been seen on the northern shores of Lake Baikal, the camel accompanies the caravans of the south, the horse has been naturalised in the south and west by the Tatars; bears, both white and brown, the lynx and glutton, are common. Besides gold, the mountains are rich in iron and copper, the former often found in large masses of what is termed native iron, the latter as malachite.

Signs of the elevation of the surface are common in Siberia, especially to the north-west of Lake Baikal, and on the coast as far as Behring's Strait. This coast is covered with islands, separated by a narrow strait from the main land. Kotelnoi is one of the largest of these, and, 140 miles off the coast of new Siberia, another group has been explored; these are rich in fossils and animal remains, which have formed a profitable export, indeed the whole lower courses of the rivers abound in such remains; here those of the mammoth were first found, and off that coast, as in the Liakov islands, entire animals have been found, with the flesh in good preservation; the connexion of these remains with the fossil deposits of the Siwalik hills is as yet an unsolved problem.

## CHAPTER VII.

## THE CASPIAN AND LAKE ARAL

1. The north-western slopes of the primary watershed.—2. The Amoo and Sir Daria.—3. The basin of Lake Aral and the steppes of the Kirghis.—4. The basin of the Caspian and boundary of Europe.—5. The south-western watersheds of the Caspian.

**THE Western Slopes of the Primary Watershed.**—The Bolor Tagh at its junction with the Hindoo Koosh forms an angle in which the waters of the Amoo, or Oxus, are collected, and from which they fall into Lake Aral, in like manner from the knot formed by the junction of this chain with the Tian Shan, those of the Sir Daria have their rise and fall into the same lake. These mountains, of which very little is known, have their culmination probably above 20,000 feet in elevation, and must, if the results of Captain Strachey's observations are adopted, be considered as forming not the least important part of the primary watershed of Asia. They may be described, so far as the slight knowledge we possess justifies description, as of most rugged and irregular form, passing round the head waters of the rivers already mentioned on the west, and those of the Tarim on the east. Two principal passes are named as connecting Yarkand and Kashgar with the valleys of the Aral, and one from thence into that of the Jhelum. The Hindoo Koosh or Koh, which separates the valley of the Aral from Afghanistan, is also called the Indian Caucasus; its summits rise above 20,000 feet, one in lat.  $35^{\circ} 40' N.$ , long.  $68^{\circ} 50' E.$ , eighty miles north of Cabool, is of much more considerable elevation, though its exact height is not known. This portion of the primary range differs little from that more to the east, save that it is more barren and destitute of the forests which are so remarkable a feature of the Himalaya. The sources of the Amoo fall from the passes which connect its valley with those of the Cabool and the Helmund. The Oonna Pass to the north-west of Cabool, indeed, connects all these valleys, and gives great importance to that city; it is estimated as above 10,000 feet above the level of the sea; further to the west, the Kaloo pass rises above 12,000 feet; the Karakootul, above 9000; but the Sikkim pass, at the head waters of the river of Balk, probably once a source of the Amoo, has only an elevation of about 8000 feet: from this, if from nothing else, the greater elevation of the mountains to the north and east might be predicated.

2 *The Amoo and Sir Daria.*—The Amoo, or Oxus, also called the Jiboon, has one of its principal sources in Lake Sirikol, at an elevation of 15,600 feet above the level of the sea, in lat.  $37^{\circ} 27' N.$ , and long.  $73^{\circ} 40' E.$  The course of this river is estimated at 1300 miles, and it falls into Lake Aral by numerous mouths. Of the affluents of this river and their sources scarcely anything is known, but they must have undergone considerable change, since the course of this river formerly was not into Lake Aral but into the Caspian. Its present channel is straight; its lower course might be navigable for 600 miles, the great fall of its upper course averaging about fifteen feet to one mile, gives it great rapidity; its waters are deep and turbid, yet in the upper course it is frozen every year; it has a delta of considerable extent but marshy, and the channels through it are obstructed by sand-banks; its principal affluents are the Soonkul or Karategin, the Kohsah or Badakshan, the Kaferuchan or Hissar, the Tupulak or Zirhal, on the right; and the Sirkab or Goree, the Kholoom, and Ardishar or Dehar, on the left. Possibly its southern source, the Sirkab, may have the greatest elevation.

The Sir Daria or Sihoun rises from two principal sources in the Tian Shan mountains, the Sir Daria and Narym; it has several considerable



affluents; it is smaller than the Amoo, but, it is said, more rapid, probably in reference to its lower course; it has an anastomosing branch about 250 miles from the Lake Aral, which appears to have, or have had, several reconnecting branches in the delta. In its middle course it is 250 yards wide, in its lower it narrows, but widens again; its anastomosing branch, the Kouran, forms a chain of lakes, and subdivides into several branches. In summer, the Sir Daria is fordable; in winter, like the Amoo, it is frozen; both rivers are subject to floods, at the melting of the snows, which continue for a long time. The course of this river is estimated at 900 miles, and from the rapidity of its current, and analogy with those of the Tarim, its sources must be very elevated, though possibly not so much so as those of the Amoo; it is the Jaxartes of the ancients. To the north are two considerable rivers, the Tchon and Yar Yatchi, the waters of which are now lost in Lakes Telekon and Kalab Koudali, which at one time might possibly have added their tribute to the main stream; the course of the former is estimated at 700 miles; in like manner, the Zohik or Sirafshan falls into Lake Karakoul, called also Denghis—*i. e.*, the sea—which is about twenty-five miles long; its waters are salt. The river Kurshee has a course parallel to the Zohik; its waters are lost in the sand; both, probably, were at one time affluents of the Amoo, as was the river Balkh, the lower course of which, divided into numerous channels, now disperses its waters in the desert, and there are in this district others of similar character.

The country which forms the valleys of these rivers is for the most part a sandy, treeless waste, but on the banks of the rivers, and where irrigation can be effected, the soil is fertile,—in some parts, as in Bokhara, extremely so. The mountain valleys on the east and south are narrow and precipitous; a great plain extends below them, having an elevation of about 2000 feet; this slopes gradually north to the Lake Aral and the Caspian, until it reaches the sea level. The fertile parts of the country are famous for rice, grain, and especially for fruits; horses and cattle abound, but timber is very scarce.

3 *The Basin of Lake Aral and Steppes of the Kirghis.*—This basin extends from the valleys of the Amoo and Sir Daria 270 miles northward to the Monghojar hills; this northern portion of the country is a salt desert, covered with small lakes but without rivers or fresh water; to the north of the Sir is the desert of Karakom, or the Black Waste, in some parts 175 miles in extent, covered with movable sand-hills, some rising fifty feet; to the south, between the lower courses of the Sir and Amoo, is the Red Waste, the surface of which is red sand thinly spread over argillaceous rock. It should be noted that in these deserts water is frequently found a few feet below the surface.

The Monghojar hills have been considered as among the southern extension of the Ural chain; these seem to the west to form the watersheds of the Tobol, Oural, and Irghiz, of no great elevation, indeed, but sufficiently well defined to be recognised. They re-appear again to the east of the Kirghiz Steppe in the Telingis, which form the watersheds of the Yar Yatchi, Tchon, and the streams falling into Lake Balkash, and are continued to the Altai; the east part of these hills contains abundance of copper, and its geological character sustains its identity with both the Oural and Altai ranges, the same red sandstone being found in them. Towards the south and east, where the hills lose their distinctness, the surface is composed of clay, marl, and calcareous tufa covered with sand, but the rising grounds present localities where agricultural industry would be rewarded, and large districts producing abundant pasture; while still further north, in the line of the watershed of the rivers flowing into the Arctic Ocean, forests of fine timber and fertile plains are found, abundantly watered by lakes and streams. The southern and eastern portion of the valley of the Aral and its tributaries is therefore the most arid and desert. In the ranges of hills which traverse its northern part, and which reach the north-east extremity of the lake, abundance of marine remains are found, and at forty miles distant from its present shore

evidences of the former presence of the waters of the lake are abundant. These hills, known as the Great and Little Bourzouk, prolong the northern watersheds between Lake Aral and the Caspian into a table-land, called the Ust Urt, extending to the south for about 400 miles, from lat. 41 to 44, rising abruptly from the Lake and Caspian to the N.N.W., to about 640 feet; in some places it reaches a height of above 700;\* a chain of calcareous hills found at its base is near the shores of the lake. This tract resembles the steppes in everything but its elevation, which, exposing it to the whole force of the wind, renders it unfit for habitation and dangerous to pass over.

The Lake, or, as it is more commonly called, Sea of Aral, is known to the Southern Asiatics by the name Kharasm, by the Russians as Cina, or Blue Lake; the inhabitants of the country, however, call it Aral Denghiz, or the Sea of Islands. Situated between  $43\frac{1}{2}$  and 47 parallels of north latitude, and 58 and 61 meridian of east longitude, it has been estimated at 370 miles in length, and 124 in breadth; its form approaches that of a parallelogram with the S.W. angle cut off and extended to the south, in the long, narrow, winding lake or marsh called Aybughir or Landan; its surface is 117 feet above the Caspian, from which it is distant about 200 miles; its area is above 20,000 square miles; it is shallow, and has no outlet; its waters are slightly saline; it is said to be occasionally frozen all over in winter. The eastern and southern shores are low and marshy, and in this part of the lake are numerous islands, some of which are inhabited; to the north and in the centre there are large islands covered with wood. Similar fabulous marvels are related of this as of Lake Baikal. Sturgeon abound in its waters, which, however, are said to be rapidly diminishing, and are so shallow and encumbered with sandbanks that flat-bottomed boats are used, but a depth of 37 fathoms has been found near the north-west coast.

4 *The Caspian and Boundary of Europe.*—The Caspian Sea, or more properly Lake, generally known now as, simply, the Caspian, is the largest lake in the world, being 700 miles in extreme length, and 420 in breadth, being about the same size as the Black Sea. Its coast line is irregular; it may naturally be divided into three parts: that on the north having the mouths of the Volga and Oural; on the east the bays Merkroi and Manghishlak; while its west limit is the peninsula forming the bay of Arashan to the south of the river Terek; from thence to Cape Apsheran, about 300 miles, the lines of the coasts are nearly parallel, but the eastern is deeply indented by the Kouli, Deria, and Balkan bays; the southern extremity has a rectangular form. The shores of this lake are for the most part low, its waters shallow, often not exceeding 12 feet at several miles from its northern shores; in the centre, to the north, it varies from 100 to 300 feet, and soundings have been attempted where no bottom has been found with 480 fathoms of line. The waters of the Caspian are, like those of the Aral, decreasing, and are probably 300 feet lower than they were in early periods of history; they are now 83 feet below the level of the Black Sea; it has no tides, and in winter the north part is frozen; seals, sturgeon, and salmon abound in its waters.

This lake receives from the north and east the waters of the Volga, Kouma, and Terek, which, as rivers of Europe, must be reserved for description with that division of the Eastern Continent. At Cape Apsheran the mountain chain of Caucasus extends itself into the lake; this must be considered a spur of the primary chain which, forming the southern boundary of the lake, extends into Asia Minor to the west, and joins the Hindoo-koh on the east. The spurs which, extending from the main chain on the south, separate the Black Sea from the Caspian, and from the watershed of the river Kour, are those which also form the boundary between Europe and Asia; they enclose the valleys of Georgia, which are drained by that river and its affluents. These expand into a very fertile plain, 75 miles in width, abounding in corn,

\* Butakoff gives its average elevation as between 200 and 300 feet. Vide *Journal of the Royal Geographical Society*, 1853.

hemp, flax, cotton; the fruits, especially pomegranates, are very fine, the grapes capable of producing the best wine, though that of the country is ill prepared: numerous horses, cattle, and sheep, of the finest kind, are reared; the hills are covered with extensive forests, composed of the trees common in Europe, and contain vast stores of minerals, especially of coal and iron.

The area of these valleys is estimated at about 20,000 square miles, its length 240, and breadth 120. The Koor, Kur, or Cyrus, has a course of about 500 miles; its chief affluents are the Aras, Alayan, and Yara. The Aras has a larger stream than the Kur; it rises in the mountains to the south of Erzeroum. The lower part of the united streams of these rivers communicates with a chain of small lakes and swamps. A large portion of the upper part of this valley is volcanic, especially where the Traporian falls into the Kur; here layers of lava, from 20 to 100 feet in thickness, rest on volcanic rocks, and beyond, a circular valley, from three to four miles wide, contains a lake from which volcanic debris are continually ejected; this lake is about 500 feet in length, and situated 50 feet above the river.

The peninsula of Apsheran is not of great elevation—not, indeed, exceeding 1000 feet; it is rocky, barren, and on the surface destitute of water. Some fruits and grain are cultivated on the higher grounds, but from the soil naphtha exudes wherever an opening is made; of this spirit there are two kinds, black and white, the former is used for coating the outer surface of roofs and buildings, as well as for burning; from the latter the inhabitants obtain light and fire for domestic uses. Near Baku is a hollow, the surface of which consists of sand, ashes, and sulphur, from the clefts in which naphtha is constantly rising. A lake in the vicinity also emits flame without heat. The south portion of this district is formed into volcanic amphitheatres by the crowding together of the spurs from the main chain of mountains; and this character is continued to the west round the sources of the Aras, where Lake Sivan occupies one of the largest of these valleys; it is 5300 feet above the level of the sea, above forty miles in its greatest length, and from six to twenty in breadth; it has at its north-west extremity an island of the same name; its depth must be very considerable, a 400 fathom line failing to reach the bottom within a very short distance of the shore; it is called from the colour of its waters Gokelch-derga, or the blue lake, more commonly Gukcha or Kukecha. The surplus water of this lake supplies the Zengue river, which flows into the Aras from the north; it is surrounded by extinct volcanoes and projecting rocks of trap and porphyry. The valley of Somkhiti in the neighbourhood is of similar character though it has no lake, but contains immense deposits of lava and obsidian.

5 *The South-Western Watershed of the Caspian.*—The sources of the Aras approach those of the Euphrates; here Mount Ararat rises above 18,000 feet, but to the north the mountains are not so elevated, few, if any, exceeding 10,000 feet in height, and at the sources of the Kur the depressions of the chain is very perceptible. To the north, however, the elevation increases; the summits are covered with perpetual snow, and rise at Mount Elbruz to near 18,000 feet, and in Mount Karbek to above 15,000. The term Elbruz should be applied to the whole range, implying snow-capped. The Circassian name of the peak, which is usually called Elbruz, is Orha Makna, mountain of happiness. It is also called Orici Gubb, —heavenly mountain; and by the Tatars Ildistaghtar—mountain of stars. The passes from the north into Georgia are difficult; the principal, the Dariel, passing to the east of Mount Karbek in long. 345, is about 8000 feet above the sea level; those between the sources of the Kour and Aras and the rivers falling into the Black Sea are lower and more available for transit. On this side the chain of the Caucasus trends north-west round the Black Sea at about thirty miles from its shore, decreasing gradually till it passes the fortieth meridian, where, at Gagra, the limestone, which forms its summit at an elevation of near 800 feet, approaches close to the sea, leaving only a narrow pass; to the east, granite and porphyry prevail and are flanked by masses of black schist; beyond Gagra to the west the chalk formation supervenes, and the

mountainous character of the east coast is changed to low, rounded, and wooded hills, with white and grey shelving rocks forming the sea shore.

The valley of the Rioni river, the ancient Phasis, which flows from the west slope of Mount Elbruz, differs considerably from that of the Kur; it is covered with extensive forests; has a humid climate; the lower part is a marshy level; and its mouth is only thirty-four miles from that of the river Thoruk. The valley of this river is extremely fertile; coal is found here in abundance, of excellent quality.

The Thoruk rises to the south-west of Trebizond, and flows through a valley separated from the sea-coast by a range of hills; it has also a northern branch, which is separated by their mutual watershed from the valley of the Phasis; it has a course of 170 miles; its banks are steep, and its current rapid; its extreme width scarcely exceeds 200 yards; the greater part of the country through which it flows is well wooded, some portions very fertile, but all mountainous. The north coast beyond the Phasis is also well wooded and fertile, but consists of little available land save the narrow valleys of the mountain stream, and at the edge of the Black Sea; but that great basin being rather European than Asiatic in its relations, will be considered together with the Mediterranean, of which indeed it forms the north-west part.

## CHAPTER VIII.

### THE WATERSHEDS AND RIVERS OF THE WEST.

1. The primary watershed of West Asia, and its inland waters. — 2. The Euphrates and Tigris. — 3. The secondary watersheds of the south and east district. — 4. The basin of the Helmund and its west watershed. — 5. The table-land of Syria and Arabia. — 6. The watersheds of the western coast and basin of the Jordan. — 7. The peninsula of Sinai, and Isthmus of Suez.

**T**HE *Primary Watershed of West Asia*.—It has been already noticed that the primary watershed of Asia has its western extension from the south of the Caspian round the headwaters of the Euphrates, and thence in a south-westerly direction, forming the limit of the Mediterranean by its southern escarpment; and in its northern slope the table-land of Asia Minor, buttressed up by the secondary range of Anti-Taurus until its outlet in the valley of the Kizil-ermak. The centre from which the mountain ranges of West Asia diverge must therefore be sought between the headwaters of the Euphrates on the south, the Karas on the east, the Kour on the north, the Joruk and the Kizil-ermak on the west.

This district, situated in the north-west of Armenia, presents similar characteristics to the other central masses of the mountain ranges of the eastern continent; for while here the greatest effect is undoubtedly to be found, the highest peaks are removed to some distance: Mount Ararat or Aghri-dagh—is, indeed, at its eastern extremity, and has an elevation of 17,210 feet above the sea; but Mount Elbruz, in the north-west Caucasus, and Aghri-dagh, in Asia Minor, are remote from it, and may be considered the points of junction of the secondary with the primary systems, on the north, indeed ill defined, but very clear and definite to the west. This district has, like that to the north, and those about the central table-land of the continent, its lacustrine basins, having no outlet to the sea: all these, indeed, surround that of the central table-land, which is of the same character; and with them those of the Caspian and Sea of Aral are generally ranked; but as those about the mountains have considerable elevation, while the basin of the Caspian is depressed even below the level of the sea, they cannot so well be classified together. Without them, however, the basins of inland waters of Asia extend from the Salt Lakes on the north, to those near the headwaters of the Songary on the east; and from the mountain district to the south of the Helmund, as far north as Lake Balkash—i. e., from 30° to 125° east

long., and from  $17^{\circ}$  to  $47^{\circ}$  north lat., or through  $95^{\circ}$  of length and  $30^{\circ}$  of breadth, and may be roughly estimated as containing more than one-fourth of the entire surface of the Asiatic division of the eastern continent.

The irregularity of the surface of this mountain district renders its description difficult, notwithstanding it has been frequently traversed, as the roads connecting the valley of the Euphrates, the Caspian, and Persia with the Black Sea and Asia Minor pass by it; although lower in elevation it is not dissimilar in character from the other central masses of Asia, and may be said to consist of a series of valleys, having for the most part a north-east and south-west direction, with lateral valleys formed by the spurs projecting from the main ranges; of these three are distinctly traceable between Armenia and the Black Sea, separating the waters of the Kizil-ernack from those of the Joruk. The mountains belong to the secondary range of Anti-Taurus, which stretches to the westward, while to the south-west Taurus extends its volcanic craters, confining the valley of the Euphrates, and giving it a south and east direction in its middle course. To the east and south from the neighbourhood of Ararat the spurs from the main chain diverge, surround Lakes Van and Urimeyah, and separate their basin from the valley of the Aras on the north, the Euphrates on the west, the Tigris on the south, and the Kizil-ouzan on the east.

Lake Van, situated between  $38^{\circ}$  and  $39^{\circ}$  north latitude, and  $42^{\circ}$  and  $44^{\circ}$  east longitude, is about 80 miles in length from north-east to south-west, and has three distinct and deep indentations to the north-east and west respectively, the two latter forming the base of a triangle nearly equilateral, which would enclose its waters: it may have in the centre a breadth of about 37 miles; in the west 15 or 16, in the east 9 or 10, and in its northern basin still less. The surface is estimated as above 4500 feet in elevation; the waters are saline, and also contain carbonate of soda, which, in conjunction with sea salt (chloride of sodium), is found floating in masses. The lake occupies the bottom of a volcanic amphitheatre; it contains two large islands, one is named Aktamar, a name extended to the lake by the Armenians; a small herring abounds in its waters.

Of similar character, but larger, is Lake Urimeyah, or Shahee, which, though not politically, is geographically in the same district: it is 85 miles in extreme length from north to south, and 25 in breadth, contracted towards the centre by promontories extending into it from the north-west and south-east; it forms two basins, into the southern of which issue the waters of the river Tabriz; its waters are extremely salt, and may have an elevation of 1000 feet less than those of Lake Van; it receives the waters of several streams.

The mountains which separate these lakes are often covered with snow in the month of June, and in their southern valleys the head waters of the Zab are collected. Round Lake Urimeyah is an extensive and fertile plain. The beauty of Lake Van and the country surrounding it is often celebrated by eastern poets.

2 *The Euphrates and Tigris.*—The river Euphrates rises from two main sources in the mountain valleys of Armenia, the Murad on the south-east, and the Phrat or Kara-su on the north and west. This latter gives its name to the united streams, though the Murad is the principal source; but, as usual, the secondary source, falling from the lower depression, has been known from an earlier period as offering the most accessible pass across the mountains.

The Murad rises on the south-west slope of the mountains of Ararat, the two peaks of which, Allah-dagh and Aghri-dah, rise above the limit of perpetual snow; its extreme elevation to the north-west is estimated at 17,210 feet above the sea; its lower at 14,320; the depression between forming the connexion between the valleys of the Kour and the Murad; and the sides sloping gradually until their outlines are lost to the west and east in the mountains which surround the headwaters of the Euphrates, and separate the Araxes from Lake Urimeyah. The mountain peaks to the north-west must be of nearly equal elevation to the summit of Ararat, as they are covered with perpetual

snow, the limit of which may be assumed as 14,000 feet. It may be remarked of this mountain, that, like all others covered with perpetual snow, it assumes at its apex a conical shape, but it has, also, a ridge-like extension towards its lower summit, which, when occasionally uncovered, rises in irregular and lofty peaks. Here are plentiful evidences of volcanic action, and iron and rock-salt are found in abundance.

The course of the Murad is first to the north-west and then to the south-west; but before it joins the Phrat it resumes the former direction. Its length is estimated at 300 miles; it receives the waters of numerous streams from the mountains on either side. The Phrat has its principal sources in the mountains, about 150 miles to the east of those of the Murad, and flows through a narrow valley in nearly a direct south-east course till it joins the Phrat, in lat.  $39^{\circ}$  east, long.  $39^{\circ}$  north; and their united waters continue in the same direction for about fifty miles in direct line, where, bending suddenly to the south-east, they receive the waters of the 'Tokmeli from the north-west; continuing this course in direct line about sixty miles, they burst through the secondary ranges, which here, in close proximity to the primary, extend from the south of Lake Van to the shore of the Mediterranean, forming an amphitheatre through which the affluents of the Phrat descend from the north and east, and after a circuitous course, in direct distance rather more than 100 miles, assume a final south-east course, which is continued to the Gulf of Persia, near Bir, or Birjik, where they issue from the hills: the elevation of the plain is only 630 feet above the sea: at Tamosat, about fifty miles to the north-east of Bir, the rivers form a double cataract, below which point it is more or less navigable to the sea; at Bir it is only about 100 miles in direct line from the Gulf of Iskanderoon, the north-east angle of the Mediterranean; at Balis, about seventy miles to the south, it is only 120 miles from the Bay of Seleucia; this is nearly the direct caravan route from Antioch, by Aleppo, to the Valley of the Phrat; from Bir the river still flows in a confined and narrow bed; and though from this point Colonel Chesney descended the river in iron steam-boats constructed on purpose, yet it cannot be considered as navigable for commercial purposes until within a short distance of Hit; between that place and Anah there is a ford having only four feet water in the dry season.

In the latitude of Baghdad the Phrat approaches within forty miles of the 'Tigris, and here the two streams are connected by several canals or branches, nature and art having both probably assisted in their construction; about fifty miles below Hillah, the ancient Babylon, situated in latitude  $32^{\circ} 28'$  N. longitude,  $44^{\circ} 28'$  east, the river passes through a marshy district extending about twenty-five miles, through which its numerous branches anastomose, and here the main stream is in some places not more than thirty-five feet broad; 1100 miles below Bir, at its confluence with the Tigris, the river has assumed a north-west direction, and between those points its average inclination is six and a quarter inches to a mile, its current from two to four miles an hour. From the confluence of the rivers the united stream is called Shat-al-Arab; its length to the sea is about 130 miles; and the entire length of the Euphrates, from the source of the Murad to the sea, although it has been variously estimated at from 1500 to 1800 miles, cannot be less than the latter. In its middle course the Euphrates receives two affluents from the left, the Bilih and Khabour, the latter the more important, giving nearly an insular character to the country between Mossul, on the Tigris, and the ford above mentioned on the Euphrates, below which the Khabour forms the main stream, and its conflux with the Tigris. At Hillah the Euphrates is only 140 yards in width, but it flows at the rate of about seven miles an hour; in its lower course it is from 200 to 800 yards in width, and flows through a very fertile level. The effect of the tidal wave is experienced on the Euphrates as high as Arja, under the 31st parallel of north latitude; on the Tigris further north, but not nearly so distant from its mouth; the distance on the one being sixty and on the other thirty-five miles.

The Khabour rises in the limestone range which forms the south boundary

of the valley of the Tigris, and extends from that of the Murad on the north-west to the Sinjar hills, near Mossul. This river has two principal sources, the Khabour to the west, and the Ras-al-Houali, or Nar-al-Sinjar to the east; both run parallel in a south-east course, until they come into a line with Mossul, where the east branch, bending to the south-west, the river continues that direction until its junction with the Euphrates; before the junction of the two branches the Khabour receives the waters of Lake Katonieh, or Kutaniyeh, which contains an island, and may be about fifteen miles in length by five in breadth.

The middle course of the Euphrates is through a country desert, without irrigation, but capable of being made extremely fertile: near Annah, to the north of the 34th parallel, chalk is found. The river is bordered with tamarisk, and embraces many islands, none of which are inhabited. In the marshes of Tadmoun, below Hilla, the bank is covered with a thick jungle of canes; this is at present only a fit habitation for the buffalo and wild Arab. On the west bank, although now it receives no affluents from the right, there are the remains of former water-courses, that would indicate not only that the river has changed its course, but that it formerly received tributary streams from that direction.

The country about the upper course of the Khabour is fertile and romantic in its appearance, in some parts well wooded, and the plains covered during the spring with most luxuriant pasture, and this is the general character of the upper country in the valley of both the Euphrates and Tigris.

The Tigris has its main sources in the district west of Lake Van, its most western is in the east slope of the mountains which form the valley of the Murad, and is about 5000 feet above the level of the sea; its eastern, the Buhtan, rises near Lake Van, at, probably, a greater elevation, and these unite about seventy miles to the south-east of the lake, before which, however, many other streams have added the tribute of their waters. The upper course of this river is extremely rapid, but at Mosul it flows scarcely three miles an hour; here it is 100 yards across, but between the point where it approaches nearest to the Euphrates and its confluence with that river it averages 2000, and here it has received the waters of its affluent, the Djal or Dijaleh, and between that point and Mossul it receives the greater and lesser Zab, and above Mossul the Kirmib or Khabour; this is scarcely more than a mountain torrent, but the lower affluents are important streams. The middle course of the river is interrupted by both natural and artificial dykes, and at Hamran the hills contract its channel to 150 yards; it is navigable to fifty miles above Bagdad for boats and vessels of light draught; during the floods in spring its waters rise twenty feet at Mossul, while those of the Euphrates do not rise more than twelve; not unfrequently at that period the lower course of the rivers become united in one immense expanse of water, extending far beyond their banks, and great quantities of mud and detritus in suspension are brought down from the hill country; its course is estimated at above 1000 miles. The greater Zab rises in the mountains of Khurdistan to the west and south of Lake Urimeyah from several sources, the eastern of which pass to the north of the head-waters of the lesser Zab and Djal; its course is tortuous, and probably exceeds 200 miles in length; it receives the waters of the Rowandiz and Khazir rivers, and its upper course is through precipitous valleys and ravines; it is rapid, but when it reaches the plain deeper than the Tigris, and nearly as broad. The lesser Zab rises in the south-east watersheds of the greater Zab, and flows through an undulating country to the river stream, which they join respectively twenty-five and seventy-eight miles below Mossul; below this the Toak and Adornah are affluents from the left, and the Djal adds its tribute to the waters a little below Bagdad, near Koural; it also receives a considerable affluent from the north-east, the Mendeli, but of the course and the courses of the rivers and country through which they flow little is known.

From the confluence of the river to the sea one principal channel conveys other waters to the sea; this receives a single affluent from the left, the Kerhka, Kurah, or Karasu, the ancient Choaspes, which rises from several

sources in the Kurdish mountains to the south of Lake Urineyah, from whence the waters of greater Zab and Kizilouzan flow to the west and east, and which form the southern watershed of the valley of the lake; it has several considerable affluents, but the country through which it flows is little known; its course has a general southerly direction, and may be estimated as above 350 miles in length.

The principal mouth of the river, the Kohre-el-Busral, has a bar with only three fathom water in it at low tide, but a channel extends to the east, and surrounds a delta of islands, divided by seven channels, this is called the Hafar Canal, and at its eastern extremity receives the waters of the Karoon, Karun or Kurun, river, which rises from two principal sources, the one to the north near those of the Koural, in about 34° north latitude, the other to the east, from the slope of the table-land of Persia, in the Koh-i-zerd, about the intersection of the 32nd parallel north latitude and 51st meridian east longitude; their united waters are navigable to the east for boats to within six miles of Shuster, under the 32nd parallel; its course is estimated at 250 miles. At the south-eastern extremity of the delta of these rivers, the Jirahi, a small river, falls into the sea. The four eastern mouths of the delta are not important, the fifth, the Kohre Omegal, though seldom used, is navigable for vessels drawing ten feet water; the seventh, the Kohre Abdallah, is by some supposed to have had direct communication with the stream of the Euphrates above Kornah, as well as the ancient channels of that river to the west of its present course; it is broader and deeper than the Shat-al-Arab. The delta of these rivers has increased with great rapidity during the historical period, and now extends about fifty miles from the Hafar Channel to the sea, and 120 along the coast.

Until recently little was known of the countries watered by these rivers: the ancient civilization of which they were the theatre led to the conclusion that a large proportion of the surface must be extremely fertile; the accounts of the ancient geographers and historians were sufficiently detailed to satisfy every one that their surface must be as varied as the character of the inhabitants, that much was always, as it is now, the natural habitation of a nomad race, that extreme fertility was confined to the immediate neighbourhood of the rivers and lakes, and that much of the mountain region was wild and rugged, but that its valleys were not the less luxuriant in their vegetable life than the hills in the timber with which their sides are covered; nor has our more recently acquired knowledge done more than confirm this; by making us accurately acquainted with a few particular localities, we are able to form a judgment of the whole, but this judgment does not alter that of antiquity. The hill region is especially one of fruits and flowers; the vine, fig, and olive grow with peculiar richness and vigour; its present products are chiefly rice, cotton, and tobacco, with herds and flocks of horses, sheep, and goats; the striking features of the low country are the absence of trees, the short duration of vegetation, and the abundance of aromatic plants; great variations of temperature take place, both on the plains and in the hill country, more, of course, in the latter; bituminous and saline lakes occur frequently in both. The mountains no doubt abound in minerals, of these lead and copper are worked in the upper valley of the Euphrates, and the latter at Arghana, to the north-west of Diarbekir. The mountains about the head waters of the rivers consist chiefly of igneous and volcanic rocks, granite, gneiss, schist, &c., with lateral formations of serpentines and outlying sandstones and limestones; the boundary of the plain of Diarbekir to the north-west is of indurated chalk, the plain itself has an average elevation of about 2500 feet above the sea. The mountains to the east are cretaceous, broken, and interrupted by volcanic rocks. The plains appear to be for the most part of sandstone, with ranges of the limestone traversing them; lower down the rivers a country of dates, rice, and pasturage is succeeded by canes, rushes, and saline marshes. Antelopes and grouse abound in the plains, wild fowl and buffaloes in the marshes; fish are plentiful in all the fresh waters.



3 *The Secondary Watershed of the South and the Coast District.*—The great range called Zagros, which forms the eastern watershed of the affluents of the Tigris, and the southern of the Kizil-ouzan, must be considered a part of the main primary range of the eastern continent; its spurs in this direction differ in nothing from those to the north-west, unless they be more abundant in vegetation, rising in lofty peaks 14,000 feet, covered with forests of walnut, oak, cedar, fruit trees, vines, and roses, to a height of 6000 feet; and of pine trees still higher: to the south, however, well-defined secondary ranges, still known by the same name, form the eastern limit of the valley of the Tigris, and buttress up the great plains of Persia, in which limestone and sandstone predominate; the latter of very recent elevation, in some parts encroaches on the lower course of the Tigris and its affluents. These ranges are for the most part parallel, having a south-easterly direction, and form narrow valleys, enclosing the upper waters of the affluents of the Tigris and Kerah.

As already stated, of the western slope of this watershed, little is known; its eastern is the great plain of Persia, having an elevation of from 2000 to 3500 feet, and having no outlet to its waters from the south, these secondary ranges are extended at but a short distance from the coast, until they meet the lower spurs of the Sulimanian range, and thus complete the circuit of the country.

The coast district is still for the most part the sandy desert which Alexander found it. The eastern portion forms the district of Beloochistan; its general elevation is very considerable; Kelat, in latitude  $28^{\circ} 52'$  north, longitude  $66^{\circ} 33'$  east, having an elevation of 6000 feet; the Bolan Pass to the east, nearly the same elevation, the peaks rise above 10,000 feet. The rivers are inconsiderable in volume of water; one, the Dirstel, though at the mouth only twenty yards wide and as many inches deep, is supposed to have a course of 1000 miles; it falls into the sea in about longitude  $61^{\frac{1}{2}}$  east.

Those mountains, where they have been examined, show the continuance of sand and limestone strata, as well as of recent volcanic action; iron, lead, copper, antimony, sulphur, &c. abound; on them comparatively few trees are found, and the products of the low lands are equally scanty; the date is found on the desert plains, and horses, camels, sheep, and goats find maintenance. This district extends 600 miles to the Gulf of Persia, and as many more along its eastern coast to the delta of the Euphrates and Tigris.

4 *The Basin of the Helmund and its Western Watershed.*—The river Helmund, the Etymander of the ancients, flows through a country not dissimilar in character to that which forms the valley of the Oxus, the difference between the northern and southern slope of these watersheds being taken into consideration; fertile only near the waters, it is more so than that of the Oxus, the winters being less severe, the difference in summer temperature not being so great. This river rises from the south slope of the Oona Pass, in close proximity to the head waters of the Cabool river, and flowing south and west, is lost in Lake Hamoon after a course of about 650 miles; it has one considerable affluent, the Urghundaub, which, flowing in a parallel course for about 230 miles, joins it eighty miles to the west of the town of Kandahar; before their confluence the Helmund is, in spring, 1000 yards across, and from ten to twelve feet deep, but is much reduced in the dry season. The principal source of this river is estimated at about 11,500 feet above the sea, and if its direct course be taken at 400 miles, may have a fall of about twenty-six feet in a mile.

The Ghomul, a considerable stream, rises from several heads to the north-west of the Urghundaub, of which it may possibly at one time have been an affluent, but is now lost in the salt lake at Istada. Lake Hamoon is also salt, and is about seventy miles in length, by from fifteen to twenty in breadth. It is of irregular shape, and said to be increasing in size; the eastern shore is marshy; it has an island, on which is Fort Rustum, or Koh-i-najeh; it is the Scistan of the ancients. Lake Zurrah, to the south, is now nearly dry.

Lake Hamoon receives, besides those of the Helmund, the waters of the Furrarh-rood, which has a course of 200 miles, from the north, and other small rivers; it has no outlet for its waters. The Zorah, which has a course of the same length, rises to the south of the Doru, an affluent of the Helmund, from the north slope of the Bolan Pass, but loses itself in the sand.

The course of the Helmund shows the main slope of this district to be south and west; the greatest elevation of its watershed is to the north-east, where the mountains rise suddenly to an elevation of 20,000 feet and upwards; the passes connecting this district with that of Balk, at the sources of the Helmund and Cabool rivers, the Oona and Hajceguik, are 11,000 and 12,400 feet in elevation, and that of Kaloo lying beyond, may be 13,500. The whole of this district to the north and east is very irregular, and interspersed with mountains, and hence is called Koh-is-than, or the hill country. The range named Suffid Koh, or white hills, which separate it from the valley of the Indus, rises about 14,000 feet above the sea, and is prolonged to the south in an irregular mountain district, of which the peaks known as the Sulimanie range, form the projecting spurs; to the east, the Suffid Koh alone retains its snows during the whole year.

The irregular valleys which slope down to the desert of Seistan are all fertile, the sides of the hills covered with forests of pine, oak, olive, and fruits of various kinds, in great luxuriance. Three ranges have been traced on these mountains, geologically, of which the third and lowest being sandstone, is barren, and the productions are similar to those of the hill countries to the east; the fruits are especially excellent; and minerals of all kinds, gold excepted, which, however, is not wanting, are abundant. The two principal passes connecting this district with the valley of the Indus, are the Khyber on the north and the Bolan on the south. The former connecting the upper valley of the Cabool river with the main valley of the Indus, more than 100 miles east of the city of Cabool, and 150 from the sources of the river, is sufficient evidence that the range, through which it extends for thirty miles, is to be considered secondary to that of the Hindoo Koh, being, in fact, a continuation of the salt range to the west. Hemmed in by precipices of slate rock 1000 feet high, it affords difficult and dangerous connexion between the lower and upper valleys, the latter connecting Kutch Gundava with the Pisheen district, which again is connected with Kandahar by the Kojuck Pass; the ravines, stretching above fifty miles north and west, having an extreme elevation of 5793 feet above the sea; here the Bholan river rises, which waters the district of Kutch, and were its waters not absorbed in irrigation, would form a considerable affluent of the Indus.

The desert lying to the west of Lake Hamoon, forms part of Iran, an appellation rather historical than geographical, and which has enlarged and contracted its limits according to the political circumstances of these countries—originally, perhaps, extending even to Syria, now, probably, limited to the narrow district between Lake Hamoon and the eastern watershed of the Tigris. The district known as the table-land of Iran, extends from the Koh-i-bundun, the western watershed of Lake Hamoon, to the Zagros mountains, the eastern watershed of the Tigris; and from the Elbruz mountains on the north, to those of the coast district already described, for about 500 miles in each direction. Though arid, and for the most part barren, it has fertile spots wherever water is found; these, though few and far between, are the resting-places of caravans, by which commercial intercourse is carried on between India and the east of Asia; our knowledge, therefore, of this country has but little increased in modern times. Its natural productions are salt, most minerals and metals; and horses, sheep, and camels constitute the wealth of its inhabitants; it belongs, physically, to the great belt of arid and unwatered land which stretches north-east and south-west from China to Africa, and then taking a more easterly course, is continued through that continent. The principal rivers of this district are the Bundemis, which, after a rapid course of about 150 miles, falls into Lake Bakhtegan; and the Zendarood, which, rising from the opposite slope

of the same watershed to those of the Karun, loses its waters in the sands of the desert. Lake Bakhtegan is about sixty miles in length from west to east, with an average breadth of eight miles; its waters yield salt in large quantities. The elevation of the lower portion of this district may be 2000 feet above the sea.

5 *The Table-land of Syria and Arabia.*—The name Syria, like that of Iran, has varied much in the extent of its application. Originally the same with Assyria, by the appropriation of the latter to the eastern portion, the former has been limited to the western; yet we have no other name by which to designate the country which extends from the eastern slopes of Lebanon to the Euphrates on the east, and into Arabia on the south. The appellation, desert, is not justly given to this district, it being a continuation of that which, extending along the base of the lower ranges of the mountains of Assyria, Persia, and India, is capable of being made abundantly productive by cultivation, having a surface of fine mould, based principally on limestone; desert now, simply because deserted by industry, and given up by its barbarous governors to their still more barbarous subjects. Like the prairies of North America, it is the natural home of a nomad race, and probably will never be cultivated but under the influence of immigration; still the district of Haouran, on the west, is the granary of the country, and gives sufficient evidence of what it might be in better hands. There can be no doubt that in the early historic period it was thickly peopled, and studded with cities of importance (see pp. 143, 144). This is the natural country of the horse, as the deserts, more properly so-called, of Arabia and Persia are of the camel.

The peninsula of Arabia has two well-defined districts of opposite character—those of the coast, fertile, that of the interior, arid; this is the Nedjed of the Arabs, and may be again subdivided, being crossed by irregular ranges of hills stretching from the Gulf of Persia to the Red Sea. The principal of these, the Jeb-el-Shammar, rising about 1000 feet above the plain. To the north of these the desert country, called by the Arabs, Shamah, extends to beyond the thirtieth parallel, rising diagonally eastward to the Euphrates, and to the south reaching the mountains which form the shore of the peninsula in that direction. Of these portions the northern is better known, from the route for caravans from the valley of the Euphrates to Mecca lying through its plain; yet the knowledge of this is extremely limited: it has been recently traversed by Dr. Wallin; the eastern portion, according to his account, appears to have a surface of loose sand, while the western is rocky, and in some places by no means wanting in fertility. "Taken in the aggregate," he says, "Nejd presents an undulating and rocky surface, intersected on the west by offshoots of the hilly ranges which run out from the western chains, and in other places varied by the occurrence of broken groups and isolated hills and peaks, apparently unconnected with each other. The plains among these hills are of greater or less expanse, and consist sometimes of 'nufood,' soft or clean sand, producing a scanty desert vegetation, and sometimes of a hard and barren soil totally destitute of verdure and life;" in the western parts sandstone predominates, but crystalline limestone occasionally protrudes, as at Teima. This district, though thus generally barren, is not destitute of fertile valleys. Dr. Wallin estimates it as about 250 miles across.

Possibly the entire of Arabia may be found to consist of two irregular mountain valleys, sloping gradually to the Persian Gulf, surrounded and intersected, especially to the south and west, by spurs from the main chains; those continued from Lebanon to Sinai and Horeb, on the north, rise 7887 feet above the sea: the mountains of Arabia reach an elevation of above 6000 at the north-western angle, at Jeb-el-Tybut, to the east of the gulf of Akaba, at Jeb-el-Akdar, at the south-east near Muscat; and of above 5400 at Jeb Tudhli, on the southern coast, near the strait of Bab-el-Mandeb; the general fall of the country must, therefore, be east and west.

The coast districts of Arabia are very similar in character, on its three sides, separated as they are from the centre by mountain ranges of an average height of 5000 feet, composed of granite, flanked with limestone, and on the

south by sandstone: coral rock abounds on the coast of the Red Sea, the steep cliffs of which are formed by that rock and sandstone. These mountains are intersected by fertile and well-watered valleys, have plentiful pasturage for large flocks of sheep, and formerly produced coffee in abundance; maize, wheat, barley, indigo, sugar, tamarinds, dates, and other fruits, are plentiful, as are valuable woods and gums.

The climate of the interior is excessively dry; of the hill country more moist, the coast of the Red Sea being healthier than that of the Gulf of Persia, which is hotter and moister.

6 *The Watershed of the West Coast and Valley of the Jordan.*—From the knot of mountains to the north-west of the sources of the Euphrates, the chain of Libanus, with its parallel range, Anti-Libanus, radiates to the south, as the Caucasus-Taurus, and Anti-Taurus do to the west. These two ranges must, therefore, be considered as the prolongation of the main chain of western Asia in that direction; the one apparently terminating in the peninsula of Sinai, but not to be disconnected from the eastern watershed of the Nile; the other extending into and round that of Arabia; and thus the Red Sea appears to be the continuation of the valley which they enclose.

To the north of these ranges the valley of the river El Aa'sy, the Orontes of the ancients, opens an easy route from the Mediterranean to the valley of the Euphrates, the mountain ranges being here depressed, and offering little impediment to the transit. This river has a course of 240 miles, and would, if cared for, be navigable for twenty miles from its mouth to Antioch; at Antioch its course changes from north to west, where it is 150 feet wide; its upper course is rapid, as its name, El Aa'sy, the Rebellious, implies; but its lower has a fall of not more than five and a half feet in a mile; it flows through Lake Homs, Ems, or Kadez, which is about thirteen miles long and two broad. The number of large cities and temples now in ruins, show the importance of this country in old times, an importance which the return of its natural trade with the East would quickly restore to it.

Libanus Lebanon, the White Mountain, so called from the white limestone of which it is principally composed, is separated from Anti-Libanus by the valley of Cœle-Syria, about ten miles in width. This country is deservedly celebrated for its beauty and fertility; the mountains producing valuable timber especially cedar, and fruits, and the valley all things necessary for the use of man; the date palm grows on these mountains at an elevation of nearly 2000 feet. The snows are permanent on Jeb-el-Makmel and Jeb-el-Sheik, as also on Jeb-el-Sannin, to the south of the former, which has an elevation of 9350 feet; the pass over Northern Lebanon to Zaleh may be nearly 5500, and that on the road from Beyrut to Damascus about 5000; the cedars may be about 6000. Jeb-el-Makmel, the culminating point of this range, is estimated as above 12,000 feet in elevation; and here the chain of Anti-Libanus diverges; from the north slope of the knot here formed, the Orontes flows, while the sources of the Litany, the ancient Leontes, rise in its southern slope. This river has a course of above 100 miles, throughout which it is for the most part a mountain torrent, unapproachable, and impassable; it is said that there are only seven places between the mountains and the sea at which its passage can be effected; nevertheless, in the valleys it is made subservient to the purposes of cultivation. To the south of this valley another knot, of which Hermon, or Jeb-el-Sheik, is the culminating point, rising to an elevation of 10,000 feet above the sea, separates it from the valley of Damascus, and of the Jordan, which having now no outlet for their waters, must be considered separately. The former might be designated as a fertile plain, if its extent and comparatively level surface were only considered; but the numerous streams which flow from the mountains which surround it, and give it its extreme fertility and verdure, uniting at the bottom of its basin, form the Bahrel-Margi, or Lake of the Meadows, which shows its true character. This valley, from the abundance of its flowers and fruits and the salubrity of its climate, is one of the four paradises of Eastern poetry.

The valley of the Jordan presents one of the most remarkable features of the surface of the earth, on account of its great depression below the level of the sea. This depression has only been satisfactorily proved within the last few years by actual survey, although satisfactorily demonstrated by science before (see *Journal R. G. S.*, vol. xviii.), the very gentle declivity of the valley from the north, and absence of an horizon by which to determine its level, having deceived the eye of the traveller; and even now it is difficult to realize, when on the spot, the truth, which has been nevertheless most satisfactorily ascertained.

The Jordan has a course of 120 miles, rising from two sources, and flowing through Lakes El Huleh, the Merom of the ancients, and Tabariyah Gennesareth, or Chinnerith; throughout the greater portion of its course the river is very rapid, and broken by cataracts, of which twenty-five have been enumerated. The principal source of the Jordan may be estimated as 2000, and Lake Merom 100 feet above the sea; Lake Tiberias is 755, and the Dead Sea 1312 below that level, which will show an average fall of the river of twenty-seven feet in a mile; its upper course would not have less than fifty-five, its lower ten, in direct linear extension, which, broken as it is by rapids and falls, must be interspersed with deep pools and still water in many places; this gives great beauty to the river, the banks of which are constantly covered with verdure, and is indeed the character of the river throughout its course; at Jacob's Bridge, to the north of Lake Kalch, where it may be 100 feet broad, it has been compared to a continuous cataract, but a temporary level is obtained in that lake, or marsh (as it should more properly be called, being covered with aquatic plants), which is about four miles in extent either way, but increases considerably in the rainy season. The Jordan has two affluents, the Sheriat-al-Mandhur, and the Zurkah; the former collecting its tributary streams from the southern slope of the watershed of the valley of Damascus; the latter, with several similar small streams which fall into the Dead Sea, draining the western slope of the mountains of Abarim and Jebel-*ez-Zubleh*, which form the watershed between affluents of the Jordan and the Euphrates. Lake Tabariyah is in form oval, its shores in many parts precipitous, giving evidence of volcanic action, which has been continued until recently; it is in length fourteen, and in breadth eight miles. The Dead Sea or Lake Asphaltites, the *Bahr-el-Lout* or Sea of Lot of the Arabs, is in length about thirty-five, and in breadth twelve miles; as already stated, its surface is 1312 feet below the level of the Mediterranean; and as it has a depth of above 2000 feet, the entire depression from *Jeb-el-Sheik* possibly exceeds 13,500 feet, by far the most considerable depression *not connected with the ocean* known on the surface of the globe. This lake has an extreme depth of 1350 feet near the centre, and the contour line of 100 fathoms approaches its shores, but the bay to the south has not more than two fathoms water, and is in the dry season little better than a morass. The south-western shores of this lake are volcanic, and several extinct craters are perceptible; the south and south-east are low and marshy; the hills in this district present granite, gneiss, and dolomite: the waters are strongly impregnated with salt, and bitumen was found in considerable quantities after earthquakes which took place in the years 1834 and 1837; rock salt abounds in the vicinity, but the mountains are principally limestone. Of this, as of other similar lakes, wondrous stories have been current, and in this case they have received apparent confirmation from the miraculous transactions which have happened on its banks; of the localities connected with these, and even of the country, its productions, and climate, modern travellers give different accounts; it is of course in such a case very difficult to dispossess the mind of preconceived opinions, or to make the necessary allowance for religious prejudices and predilections. At Jerusalem the maximum range of the thermometer is from 45° to 80°; snow falls occasionally during the three first months of the year, and in September the corn is green, and oranges begin to ripen in January; the fruit ripens in the next month; the end of April and beginning of May is the time of harvest; but in the valley of the Jordan, by

this time of the year, the heat is so extreme that everything is burnt up and withered; July and August are the first months in which grapes and olives abound in great perfection; maize and cotton are gathered in September; October is the month of vintage; November of rice harvest, and seed time for corn; December the only winter month, in which the plains recover their verdure, and give food to the cattle. This country might well be naturally as it is spiritually, the joy of the whole earth; and even now, in spite of the tyranny and extortion of its governors, the insubordination of the Arab Sheiks, the indolence and demoralization of the population, its natural wealth and beauty cannot be concealed.

The mountains of Moab to the south-east of the Dead Sea rise to an elevation of 3000 feet, and are continued, as already noticed, into Arabia. From the Dead Sea the valley is still continued southward, but gradually ascends for about seventy miles to El Sateh, a little to the north of the thirtieth parallel, which is the watershed of the country, at an elevation of about 500 feet; from whence it again descends, and is continued into the Red Sea, through the Gulf of Akaba, the Sinus Eilanites of the ancients.\* This country, the Edom of Scripture, is the Arabia Petraea of Ptolemy, well deserving its name; its principal city, Petra, has been hewn out of the rock; the inaccessible character of the country has been the protection of its inhabitants from their more powerful neighbours; its barrenness an incentive to a predatory life. The commerce of Palestine with the Red Sea, and consequently with Africa and India, must be dependent on its possession.

7 *The Peninsula of Sinai and Isthmus of Suez.*—This peninsula has already been indicated as resulting from the continuation of the mountains of the coast of Syria to the south. Physically, therefore, the whole coast district from Mount Carmel to the eastern mouth of the Nile must be included; historically we know that it has been so: speaking of this district generally, it may be said that the mountains of Syria extending southward as the west limit of the valley of the Jordan or El Ghor, and the Wady-el-Araba, the continuation of that valley towards the Red Sea, take a semicircular sweep to the west, as far south as Jeb-el-Edjme, under the twenty-ninth parallel, corresponding in outline nearly with the shores of the Mediterranean, having a gradual slope towards that sea, but broken and divided by spurs from the main hills, which are more elevated, and massed to the east; the plateaux immediately below the Jeb-el-Edjme may be 2000 feet above the sea, that mountain having an elevation of 4645, behind which, to the south the great mass of Mount Hor, with its buttresses, Serbal on the west, and Abu Muzrud on the east, rise respectively 8850, 6753, and 8700 feet above the sea, from which the highest peak is not more than thirty miles distant. The grand triangular knot is separated from El-Edjme by the plain of Hadarah, which rising in the centre, about 4000 feet above the sea, falls gradually towards the east and west. It is also divided from Arabia on the east, and Egypt on the west, by the Gulf of Akaba and the Gulf of Suez respectively, on the shores of which, at nearly a right angle, the lofty Tybut Issum, Moileh and Agrib, rise above 6000 feet in elevation.

The Jeb-el-Tyh, of which Jeb-el-Edjme is the centre, may be considered as a continuation of the mountains of Edom, from El Sateh, if El Sateh be the water parting between the Gulf of Akaba and the Dead Sea; and also the watershed of those torrents, which at some former time united in one stream, fall into the sea at El Arish, the Rhinocorura of the ancients, the outlet of the valley between it and Sinai being, as already noticed, east and west. That a great change must have come over this country since Abraham led his flocks and herds through it, and all nations went down into Egypt to buy food, is apparent; which, whether it has been consequent on a rise of the land on the shores of the Mediterranean, or a depression of the valley of the Jordan, or

\* See, however, on this point, *Journal Royal Geographical Society*, vol. xxiii.

generally from the multiplied action of volcanic forces over a large surface in many years, has yet to be determined.

As Lebanon and the spurs projecting from it in the extension to the south terminate at the sea in bold headlands, the coast district is broken into small fertile valleys, more fertile to the north in the neighbourhood of the mountains, and becoming less so from want of water to the south, where the watershed is depressed. In this district the heat is considerable, tropical fruits flourish, and the sides of the hills afford plentiful pasturage for flocks and herds. The elevations to the west of the Jordan are of oolitic limestone and indurated chalk, full of caverns and fissures, resting on a basis of silurian rocks, which crop out in Lebanon. The limestone formation is continued through the Isthmus of Suez into Egypt; here it appears like steps through the shifting sand, and is interspersed with saline pools; but when the water of the Nile can be used for irrigation, the soil is found to be fertile. The Isthmus is seventy-two miles in width. The pools or lakes, above alluded to, are found principally on the south side, occupying the bottom of a valley about twelve miles wide, to the north of Suez, which is only divided from the sea by a narrow strip of land, and may have been, not improbably, once filled by the sea, as the lowest level of its waters is fifty feet below that of the surface of the Red Sea. To the north the surface of the country falls toward the Mediterranean, and the valley of Egypt. It was formerly thought that the level of the waters of both the sea and the river was lower than those of the Red Sea; the surveys of Mr. Stephenson, however, have shown that of the two seas to be the same, and leave little doubt that the valley of the Bitter Lake was once a portion of the latter. In the months from October to May the southerly monsoons heap up the waters in the gulf, so that their level is at that time higher than those of the Mediterranean.

There is a remarkable similarity and a remarkable diversity of character observable between the three great peninsular masses, Arabia, Asia Minor, and Iberia; their general character, shape, and position are similar, but their external relations and productions are strongly contrasted. Arabia, the most southern and largest, has the least elevation, by much the least in proportion to its extent, which is, with respect to the others, as seventeen to four, and three, hence it does not approach the line of perpetual congelation, and is deficient in moisture; it has, however, the advantage in local attachment both by sea and with the valley of the Euphrates, while the others are cut off from the continent by the mountains which form the basis of the systems.

## CHAPTER IX.

### OF ASIA MINOR.

- § 1. General description.—2. The watersheds.—3. The inland basins and lakes.—4. The rivers of the north.—5. The rivers of the west and south.

**GENERAL Description.**—Few portions of the earth's surface afford more interesting subjects for consideration than Asia Minor, either in their natural or historic relations; occupying an intermediate position between the great European and Asiatic basins, connected by its river basin with the interior of Asia, and by the proximity of its shores—as at the Hellespont and Bosphorus—as well as by the islands, with Europe, it has been the intermediate stage of civilization; it lies between  $36^{\circ}$  and  $42^{\circ}$  north latitude, and  $26^{\circ} 4'$  and  $37^{\circ} 50'$  east longitude; its area may be estimated at more than 200,000 square miles; it may extend 450 miles in length by 360 in extreme breadth, and its coast line may be three times the length of the normal figure which would bound it, being a parallelogram, having its longer sides from east to west; the

greatest breadth is in the centre, on each side of which it decreases to 210 miles.

The mountain systems of Asia Minor, extremely irregular in their arrangement, may yet be grouped into two great masses: that on the east forming a vast triangle, covering the head waters of the Kizil Irmak, united to the mountains of Armenia on the east, and throwing out great spurs to the north and west, having Mount Argeus for its culminating point at the apex of the triangle; and that on the west formed by Ak Dagħ, which, though of less elevation, projects its spurs, in broad and extended masses, in every direction, giving to the western coast a varied and deeply-indented outline. These divisions are united by the coast range of the south, an extension of Anti Taurus, which, culminating at Kara Dagħ, only 75 miles from the coast, bends in a semicircular direction round the great central plain, which is the peculiar characteristic of Asia Minor, and may be 150 miles long by 100 broad. The great mountain masses are formed of igneous and volcanic rocks, with chalk and limestone superimposed, and, in the north, sandstone; they have, therefore, two characteristics, presenting themselves at their greater elevations, in rugged cliffs and peaks, and in their extensions, especially on the margin and within the limits of the great plains and river basins in rounded plateaux.

As the mountains cover the greater portion of the surface, and in their ramifications enclose considerable basins, the drainage into the sea is not in proportion to the extent of the area. The rivers are rapid and intermittent as to the quantity of their waters, the lower courses subject to inundations, the upper to drought.

2 *The Watersheds.*—It has already been noticed (p. 261) that the point of divergence of the mountain systems of Asia Minor must be looked for about the head waters of the Kizil Irmak, and here, near the intersection of the 37° meridian east, from Greenwich, with the 39° parallel of north latitude, the pass connecting the head waters of that river with those of the affluents of the Euphrates and the Seyhoon approaches 6000 feet in elevation. Irregular but lofty chains, (the ancient Taurus?) of which little is known, connect this point with the coast chains of Syria, these may culminate in Giaour Dagħ, at above 11,000 feet; but the pass which connects the head waters of the Djeihoon with the Geksou affluent to the Euphrates does not much exceed 3200.

Two long parallel ranges, commonly known as Anti Taurus, extend to the south-west for nearly 100 miles, at about ten miles distance from each other: the eastern, comparatively unbroken, is sufficiently elevated to be covered with snow in summer; it culminates about the centre in Binboa Dagħ, below which lies to the north-west a lower parallel range, covered with wood; the western, more broken, is known under several local names; it culminates about the centre in Katran Dagħ, where the sources of the affluents of the Kizil Irmak closely approximate to the centre of the upper valley of the Seyhoon, on either side the pass of Sarris; the mean elevation of this chain may be 4000 feet, its culminating points probably exceed 7000. The greatest elevation in this district appears, however, in Kernes Dagħ, a transverse chain at the south extremity of Anti Taurus, which rises above 11,000 feet.

The slope of the western chain to the valley of the Kizil Irmak in the north is first abrupt, and then descends in a succession of terraces, forming shallow parallel valleys; the north-eastern extremity extends, in a series of elevated plateaux, towards the mountains of Armenia. The principal watershed between the Kizil Irmak and Seyhoon is continued westward in the two spurs of Kale Dagħ, and the southern of which forms the connecting link with Mount Argeus, and rises 6500 feet. Mount Argeus, Ardjis Dagħ, the culminating point of the eastern systems of Asia Minor, stands, as usual, in advance of the main watershed, on a plateau of about 200 square miles in extent, of irregular shape, about forty miles from north to south, and as many from east to west, but having its greatest extension to the south, on which side the longer slope is covered with volcanic cones projecting from the basaltic rocks, which form the



body of the mountain, a feature repeated on the north-west, but on a more irregular and broken surface, even beyond the basin of the silvery Salt Lake, the eastern limit of which is indented with numerous ravines, at an elevation of above 4000 feet on the north. The descent is precipitous to the valley of the Kara-sou, an affluent to the Kizil Irmak, while the eastern projections are marked by the isolated peak of Karmas Dag, abounding in fossil remains.

From the upper plateau, Mount Argeus appears in two conical peaks, the eastern rounded in form, the western 'bristling with needles and furrowed with cavities,' and forming, on the north-east, an immense crater-like funnel, remarkable for its depth; the western peak is the most elevated, and reaches an altitude of about 14,500 feet. The highest point yet attained, the inclination of the side of the cone being 50°, has been about 11,500 feet, which may be considered the limit of the snow-line; glaciers descend into the valleys on all sides. This mountain is the centre of a triangle formed by the chains already mentioned with those of Hassan Dag and Kodja Dag to the west, seventy-five miles from north to south, on a base of 175 miles from east to west, the sides being above 100 miles in length, the apex at south in Ala Dag, and the angles in Tonnous Dag to the east, and Kary Oglan Dag on the west, the valley of the Kizil Irmak forming the base to the north. Hassan Dag, on the west, has an elevation of 9000 feet, and throws out considerable spurs; these rise 5000 feet to the north-west, spread into extensive plateaux, of about 4000 feet elevation. Yekil Dag unites Hassan Dag to the apex of the triangle by a steep wall of rocks, furrowed by gorges; and here is the principal pass of Misti, from the plateau of Mount Argeus to the central plateau of Asia Minor, at an elevation of 5000 feet; while another, somewhat lower, opens communication to the south and east with the valley of the Seyhoon. Hassan Dag is formed of trachytic rock, and from it extends, to the west, the almost isolated mass of Karadja Dag, covered with cones and craters, one of peculiar shape, rising from the centre of Salt Lake at the base; this is connected with the mountain ranges to the west by extensive plateaux, which form the limit of the upper basin of the central portion of Asia Minor, the tertiary plain to the north being separated from it by conical hills, like palisades; the general elevation being about 4000 feet.

The apex of the triangle already described, Ala Dag, is separated from the range of Anti Taurus by the gorge of Farach, and, on the west, from Boulgar Dag by the pass of Genzel Thoro, or Thoroglou, the Pilä Ciliciä of the ancients, where the harshest features of Alpine scenery are conspicuous; both opening to the upper valleys of the Seyhoon. This great mountain mass culminates about 13,750 feet above the sea; its north face is distinctly defined, and its western summits rise in picturesque peaks; on the north, ranges of chalk hills form parallel valleys; on the east, terraces, divided by pointed rocks, descend gradually, also forming parallel valleys, at an elevation exceeding 7500 feet.

Boulgar Dag extends the range of Anti Taurus into ancient Cilicia, culminating more than 13,000 feet above the sea; the south and east faces are precipitous; the vine fails here, at an elevation of 6000 feet on the north side, but flourishes at that elevation on the east side; it stretches to the south-west in wide plateaux to the valley of Ermenek-sou, as well as to the north-west. The pass of Karaman, opening communication with the valleys of Cilicia, may have an elevation of above 7000 feet.

The coast chains of Andricus and Imbarus, to the south-west, present inaccessible precipices towards the sea; these surround the fertile and beautiful valleys of the Ermenek-sou, and join the deep gorges and rugged peaks which are formed by the north-western spurs from the great mass of Geuk and Tinas Dag, which extends to the west fifty miles along the coast, and culminates 11,000 feet above the sea; these spurs extend to the isolated peak of Kara Dag, which rises from the plain opposite to Karadga Dag. From Tinas Dag, rugged spurs extend southward to the sea, forming the valleys of

the small rivers which flow into the Gulf of Adalya, and culminating in Boz Bourun Dag, opposite the centre of the gulf, about thirty miles from the shore, at about the same elevation. Kara Dag is the point of junction to the west of the coast chains, and their irregularity and rugged character is seen in the pass from the valley of Lake Kestel, being nine miles long, at an elevation of 3500 feet. Kestel Dag, extending to the south, joins Kizildag Dag and Elmalu Dag, having an elevation of nearly 12,000 feet; here the mountains are divided by narrow and deep gorges, forming funnels and craters; their peaks are lofty, reaching up to and beyond the snow-line. The unbroken semicircular mass of Baba Dag presents an amphitheatre to the west, and its extension towards the north is formed by three chains—Lida, Grinium, and Latmus—which extend to the Gulf of Mendelia, and to the north spread out into the plateau of Beck Permak Dag (round the base of which the Meander flows into the sea), surround Lake Akiz, and are reproduced in the islands of the *Ægean*; the southern spurs form the promontory between the Gulfs of Kos, Syme, and Makri, and appear again in the island of Rhodes.

The region of lakes to the north is encircled by a range of mountains, extending above 150 miles, from the spurs which unite them to Karadag Dag and the mountains of the east, to the southern spurs of Ak Dag on the west; on the east it is formed of two chains, parallel for near 100 miles, Sultan Dag on the south, and Emir Dag on the north; here isolated peaks attain considerable elevation, and from them broad masses spread to the south and west. The elevated platform between these ranges and Kestel Dag to the south opens communications in all directions: those from east to west have an elevation exceeding 4000 feet over the southern spurs of Sultan Dag; that to the north, through a deep ravine, does not exceed 3500 feet, which is about the elevation of the passes to the south leading to Kestel Gheul.

The northern watershed of the Meander is formed by ancient Missoguis, which extends to the coast near Gumuch Dag, or Silver Mountains, and Samson Dag, and is continued through the island of Samos from the eastern extremity, the ancient Tmolus diverges towards the north-west, and extends in irregular broken spurs along the Gulf of Smyrna, and to the island of Kios; its extension to the west approaches within three miles of the sea, is massy, and furrowed with deep gorges; the pass leading over Missoguis by Djuma Dag has an elevation of 4500 feet; there does not appear to be any pass over Tmolus until towards the western extremity. To the south, Ak Dag, which is the centre of the western system of Asia Minor, extends its massy spurs in every direction; these are more remarkable for their breadth and solidity than their elevation, Ak Dag, rising only about 9000 feet above the sea; Emir Dag and Sultan Dag must be considered the extensions to the east; and on the west, Mouzluk Dag stretches in solid mass for fifty miles, almost to the shore of the Propontis, throwing out three considerable spurs to the west and south, enclosing valleys, which, however, do not attain a greater elevation than 2500 feet, nor do the passes to the north-east and west of this chain rise above 1500 feet; that of the Ougundja Yaila, to the east, is estimated at rather more than 1000 feet, and here the country is broken into fertile valleys and verdant plateaux, where the grass in winter flourishes, and the waters are never more than slightly crusted with ice; to the south, however, Hassan Dag terminates in the bold trachytic heights of Dumanlu Dag, culminating 5000 feet above the sea. Madara Dag, to the north, is a mass of syenite, but Oulevan Dag, its southern extremity, slopes gently towards the Gulf of Mytilene, having a plain three miles wide at its base.

The syenite rocks of Oulevan are of most irregular and romantic aggregation; to the north they assume imposing forms, broken by rugged peaks and rocky defiles. The highest elevation of the pass across this chain approaches closely to 2000 feet; a race of Troglodytes inhabit it at an elevation of 1000 feet. Similar features are apparent in the mountains on the northern

coast of the Gulf of Adremia, which attains an elevation of 6000 feet. Here is Kas Dag, known as Mount Ida. To the west and north the mountain forms are more regular and gentle, being composed of rounded masses, for the most part covered with pines; but the rugged, black trachytic rocks appear again on the southern shore of the Propontis, in the isolated mass of Kapou Dag, the ancient Cyzicus. Terraced hills and undulating wooded country characterizes the coast to the east of the Bosphorus. The western spurs of Ak Dag are extended across the central plains of Asia Minor, in plateaux which connect them with the mountains to the north of the Great Salt Lake; the southern spurs of Ketchich Dag, the Mysian Olympus, connect it with Ak Dag and the extensive plateau of Mourad Dag. This is one of the most important mountain ranges in Asia Minor, it culminates at above 7000 feet, and its snowy summits are seen from Constantinople, sixty miles distant; it slopes rapidly to the valley of Lake Apolonya on the west, and extends a considerable spur to the east into the main valley of the Sakaria, its southern extremity, Moualar Dag, is crossed by a pass nearly 4000 feet above the sea, remarkable for the picturesque grouping of the rocks which form its gorge. The rugged trachytic mass, Karakaya Dag, is opposed to Olympus on the east, and rises in gigantic precipices; from it continuous ranges extend for 100 miles to the shore of the Black Sea, and it is crossed by a transverse range about the centre, where the elevation may reach 7000 feet.

The limit of the great central basin on the east extends from Mount Argeus by Kodja Dag and the basins of the Great Salt Lake, to Kartal and Kure Dag, which are the connecting links between the southern and northern chains, of which latter Ala Dag is the most important, extending for 150 miles, until it meets the western spurs of the Karakaya Dag. Ala Dag culminates about 7500 feet above the sea; its western extremity is an elevated plateau, a deep valley and torrent intervening; numerous streams flow from the flanks of this range, which, extending to the east in Ichik Dag, is crossed by a transverse line of trachytic peaks; the sides of this chain are remarkable for the beautiful parallel valleys formed by five distinct ranges of heights. Ichik Dag extends to the south in Hussein and Hassan Dag; the latter had snow on its summits in June. To the south the granitic ranges extend along the eastern basin of the Great Salt Lake; these have a mean elevation of about 4500 feet, and are crossed by numerous defiles; here the triple rampart of Kodja Dag is connected with Mount Argeus by the plateau of Chehr, having a deep valley to the east, through which is the pass to the southern central plateau and the valley of the Seyhoon, by the southern extremity of Hassan Dag, uniting with that of Misti; the upper plateau may have an elevation of 6500 feet.

To the north of Ala Dag, the parallel ranges of Dogdou and Ilkas Dag extend for 100 miles, and beyond Alfar Dag forms the coast line; these are crossed near the centre by a pass leading from the little river Daourikan, which at its summit in the northern chain attains an elevation of nearly 2000 feet, and over the central mass of above 7000 feet; the sources of the torrent Karadere being 6000 feet above the sea, and the lateral valleys 4750 feet. Ilkas Dag was covered with snow on its superior summits in August, 1850.

Yuldouz Dag, a spur from the loftier chain of Keuch Dag on the east, which unites with the mountains of Armenia, spreads in broad terraces between the head waters of the Kizil and Yekil Irmak; the pass across the chain between the valleys of the two rivers by the Yuldouz, an affluent of the former on the right, is through a defile at an elevation of about 3750 feet. The plateaux of Yuldouz extend westward nearly 100 miles, and then bend northward round and between the affluents of the Yekil Irmak, presenting rounded surfaces not reaching 4000 feet in elevation. To the north-east, however, Kourt Belli Dag and Kal Boyuz Dag, the northern spurs of Keuch Dag, between the eastern affluents of the same river, present lofty and rugged ramparts; to the south and west the greater elevations are continued in Ak Dag, consisting of parallel ranges, presenting fertile valleys and verdant plateaux, and

culminating at the north-east in Nalban Dag, at nearly 8000 feet; here are silver mines at an elevation of 4750 feet. The slope of Ak Dag is very gentle to the north-west; there are gorge-like valleys, from east to west these are traversed by passes from the south, the highest elevation of which is 4750 feet. On the west, opposite Ak Dag, Tchitchek Dag presents a plateau furrowed by valleys and crowned by granitic hills; the valleys between these mountains are of higher level than that of the Kizil Irmak, and the Pass of Yuzgat over the western extension of Yuldouz Dag, has an elevation of 6500 feet; the gorge to the south being formed by precipitous rocks. To the south of Tchitchek range is the great plateau of Bozok, presenting a circular face, for near 100 miles, to the valley of the Kizil Irmak, round which that river bends to the north; the elevation may be about 5000 feet; it is separated from the valley to the south by granitic ranges with deep gorges, nevertheless, vegetation is here luxuriant.

The extensions of Yuldouz Dag to the north present themselves on the coast in rounded forms not exceeding, at Bouchalan Dag, 5000 feet in elevation, over which the summit of the pass from the coast to the central basin of the Yekil Irmak is about 4000 feet. To the east, however, the chains are more lofty and better developed, and beyond the vast marshy plain at the mouth of the Yekil Irmak approach the coast, which is famous for its beauty, yet inferior to that of Cilicia and the rest of the southern coast of Asia Minor.

The central basin of Asia Minor may be estimated at 6000 square miles in extent; the most level portion is the upper or more southern, the basin of the Great Salt Lake, undulated with isolated mountains forming the buttresses of plateaux rising from it. The upper basin of the Sakaria is also of very varied character. The tertiary plain of the upper basin of the Kizil Irmak may have an extent of 1000 square miles from the junction of its principal sources at the foot of Yuldouz Dag. The great plain or Yaila of Ouzoun, about the head waters of the western affluents of the Euphrates, east of the pass of Ouzoun, extends 250 miles, at an altitude of 5500 feet.

3 *The Lakes and Inland Basins.*—From what has been already said, it is apparent that, by much the larger portion, the surface of Asia Minor is covered with mountains; and that these enclose, in many parts, basins which have no communication with the sea. As in Asia generally, so therefore in Asia Minor, an account of the lakes forms an important element in its description. They may be divided into four classes:

1. Lakes of fresh water not belonging to river basins.
2. Lakes of salt water deriving their saline properties from the geological formation of the basins.
3. Lakes of brackish water often showing former connexion with the sea.
4. Lakes forming part of the course of rivers.

To the first, commencing from the north-west, belong the Lake of Nicomedia, or Sabandja Gheul, its area is estimated at twenty square miles, its circumference thirty miles, and its elevation 375 feet above the sea. The position of the lake, in a depression between the Sea of Marmora and the lower course of the river Sarkaria, has suggested a connexion with the Black Sea. The shores are richly wooded and fertile. The Lake of Nicea or Isnik Gheul, is in area forty-five square miles, in circumference forty miles, and in elevation about 100 feet; three miles distant from the sea, it is separated from Lake Nicomedia by Boroudjoun Dag, and by the range of Olympus from Lake Apolonya; it probably has connexion with the Gulf of Ismid.

To the south of Kemir Dag and Kestel Dag, there are several small lakes of this class, varying in area from three to six miles, at considerable elevations above the sea, receiving small mountain streams, but having no outlets; the largest of them is Kestel Gheul, which is intermittent, but has an area of twelve square miles, at an elevation of 3250 feet above the sea. This lake receives the considerable stream Istamak Tchai from the south.

Lake Eguerdir, lying among the south-western spurs of Sultan Dag, bounded by lofty rocks interspersed with the richest vegetation, and having many islands, is famed for its beauty; its area is about fifty square miles, its circumference may be seventy-five miles, it being prolonged in a narrow gulf to the north-east, and its elevation about 3200 feet; it receives from the south the surplus waters of the small lake Goude, distant ten miles.

Lake Kereli, or Bey Chehr, lies between the south-eastern spurs of Sultan Dag, and the rugged ranges of the coast; is in area 120 square miles, in circumference seventy-five miles, and in elevation above 4000 feet. Beautiful valleys open round this lake, crowned to the south with snowy peaks; its waters are said to be supplied from subterranean springs, and it may not be improbable that they are affected by the emission of gases from the rocks which form its basin; it is united with Lake Soghla, twenty-five miles distant to the south-east, by the small stream Bey Chehr; this, however, as well as the lake, was dried up when visited by Tchihatcheff. Several small fresh-water lakes, the dimensions of which vary with the season, lie in the valleys between Sultan Dag and Emir Dag.

Lake Eregli, or Bektik Gheul, situated on the southern edge of the great central basin, is surrounded by marshes, but may have a normal area of twelve square miles, at an elevation of 4125 feet.

In the second class we find two small lakes below the southern spurs of Sultan Dag, Tchurouk-sou Gheul and Bouldour Gheul; the waters of the latter are strongly impregnated with sulphates of soda and magnesia, and chloride of sodium, like the German mineral waters at Seidlitz, &c.; the area of these lakes may be about twenty square miles, their elevation about 3000 feet.

The Great Salt Lake, *par excellence*, Touz Gheul, lies at the foot of Kodja Dag, and the western spurs from the great knot of Mount Argeus. It has an area of 175 square miles, a circumference of seventy-five miles, and an elevation of 3550 feet. In the summer a mass of saline incrustations rests on the blue clay which forms the bed of the lake; in winter this is raised by the water of the several streams which flow in from all sides increased by the rain; the glistening whiteness of the salt contrasts singularly with the verdure of the surrounding hills. Many small salt lakes are found in the plains to the south and west; one of which, below Karadja Dag, yields salt in equal abundance, as does Lake Develi Kara Hissar, or Givach Gheul, on the western side of Mount Argeus, at an elevation of 4600 feet; and Lake Pallas, a very small lake in the upper valley of the Kizil Irmak, and many others in the same valley, which is a region of saline deposits, stretching eastward beyond the thirty-seventh meridian east longitude, some of which are more than 5000 feet above the sea. In the great central plains to the east of Emir Dag, there are also lakes belonging to this class, the waters of which are brackish and bitter, and are the harbourages of multitudes of wild fowl; and one to the north, in the valley of the Soaumer-sou, at an elevation of 5625 feet on the southern slope of Keredi Dag. Mernierè Gheul, lying in a lateral valley among the lower spurs to the south of Ak Dag, and close to the valley of the Caister, is also saline; its surface is scarcely above the sea level, it has an area of nine miles.

Of the third class, Lake Akiz Tchai is probably the remains of the Gulf of Latmus, it has an area of eighteen square miles, and its surface is about 100 feet above the level of the sea. Kendjez Liman, to the south of Boz Dag, as its name (Liman Gulf) implies, was also probably once an inlet of the sea; its surface level is lower than that of Lake Akiz Tchai, its shores are marshy, and it receives several small streams. A large marshy tract, indicating similar changes, lies at the head of the Gulf of Adaliya, between the rivers Ak-sou and Kempru-sou.

The fourth class will be naturally included in the description of the rivers.

4 *The Rivers of the North.*—The longer slope of this country being to the north, the largest rivers of Asia Minor fall into the Black Sea; of these

the more important are the Yekil Irmak, the Kizil Irmak, and the Sakaria. The Yekil Irmak rises in the Kourt Belli Dagħ and the northern slopes of Yuldouz Dagħ, in close proximity to the northern sources of the Kizil Irmak; at the pass of Tokat it has an elevation of 1650 feet; the average fall may be five feet to a mile, and in its middle course it flows between precipitous rocks, it there holds carbonate of lime largely in solution; it is shallow, and generally fordable, its banks rocky to within twenty miles of its mouth. The principal affluent of the Yekil Irmak is the Tehekerek-sou, which rises to the south of the pass of Tokat, and encircling the plateau of Devedji Dagħ, joins the main stream in its middle course; the upper extremity of its valley has an elevation of near 4000 feet; its length may be estimated at 100 miles; another affluent of the left is the Terehan-sou, which flows through the beautiful plain of Sulay Qumrī and then reaches the Samsatli which has its source in

ly affluent of the right is the Kouli Hissar, or Guermeli, which has its source in the mountains of Armenia, to the north and east of Geuk Dagħ, and must have as great a length as the main stream.

The little river Termé, as its name seems to imply, flows through a valley noted for its hot springs, to the east of the Yekil Irmak.

The mouth of the Kizil Irmak is about forty miles from that of the Yekil Irmak, in direct distance across a deep bay, into which no streams flow worthy of notice. The main source of this river is in the Gueimbelli Dagħ, at an elevation considerably exceeding 7500 feet; here a torrent, it is joined by other torrents from north and south, which, uniting, flow through a deep and rocky bed from east to west, below the northern spurs of Mount Argeus, where it receives the Kara-sou from the south; from hence it flows in a semicircular course to west and north, round the spurs at the base of the plateau of Bozok, where the fall is thirty feet to a mile, and continues its course to the north with great rapidity, through a narrow gorge of syenite rocks, from whence, flowing between lofty plateaux in a serpentine course, it issues on the fertile plains of Hadji Hamsa, and receives the Deverik-sou from the west. This may be considered the lower course of the river, which now assumes a north-westerly direction below the rugged sides of Ilkas Dagħ; here it receives the Geuk Irmak from the west, about forty miles in direct distance from the sea; its length may be estimated nearly 700 miles; its width varies extremely, even at the mouth; its name, Kizil (Red), indicates the quantity of sediment brought down by it from the mountains. The affluents of this river, in its upper course, are unimportant; in its middle course it has only one from the right, the Delidgi Tchai, which has its rise in the western spurs of Ak Dagħ, drains the great plateau between the Kizil Irmak and Yekil Irmak; it may have a course of 150 miles; but in summer much of its upper channel is dry, and many of its affluents are only winter torrents; its course is little known; about the centre it has an elevation of 3500 feet. In the lower course of this river, the affluents are on the left, these are the Deverik Tchai, which flows through the long, narrow valley to the north of Ala Dagħ, and Ichik Dagħ from west to east; its length may be seventy-five miles; its affluents are torrents from the northern face of Ichik Dagħ, and much of its channel is dry in summer: the Geuk Irmak, which rises at an elevation of about 4000 feet, in the gorge between Dogdou and Ilkas Dagħ, and flows with a rapid and deep stream through a narrow valley, hemmed in with mountains, where, at its junction with the main stream, it forms a highly picturesque defile; it has for affluents numerous torrents on the right: one, the Stavros Tchai, formed by the confluence of two streams, rising on the Taouchan Dagħ, at an elevation of above 5000 feet.

Many small streams fall from the mountains into the sea, between the Kizil Irmak and Sakaria; two only appear to assume the character of rivers; of these the Boli-sou, known also as the Tiliās Tchai, and by other names, receives

for affluents many large mountain streams, among which the Soaumer-sou, from the right, is noticeable for size and beauty, and which has, in its upper course, an elevation of above 3500 feet; these drain the extensive valleys formed by the plateaux projecting to the north from Ala Dagħ, while the main stream is shut in to the west by the north-eastern extension of Boli Dagħ; of the country through which it flows, however, little is known. The Nulan-sou has its source in Boli Dagħ, near the pass of that name; it receives many small affluents before reaching the plain of Dusdje; its course is slow, and waters muddy, though their volume, even in summer, is considerable.

The Sakaria rises from two principal sources, the eastern at an elevation of 3800 feet, in Mourad Dagħ, and its eastern extension; these unite in an eastern course, 3350 feet above the sea, among the plateaux of the great central basin, and bending northward, and again westward, enter the mountain region between Bos Dagħ and Karakaya Dagħ, before which it receives its only affluent from the left, the Poursak, the ancient Thymbres, which, rising on the northern slopes of Mourad Dagħ, has a tortuous course of seventy miles, and about its middle course has an elevation of 3500 feet; the stream is shallow, and its banks low; it has several small affluents from the left. In the upper course, however, the Sakaria has several affluents from the right; the Kutchuk Sakaria, rising in Bechir Dagħ, at an elevation of more than 3500 feet, remarkable for its muddy bed, which renders it almost impassable; the Engunu-sou, rising in three sources, two from the south-western slopes of Ichik Dagħ; from whence also the Kerimiz-sou, or Emir Tchah, rises, at an elevation approaching 4000 feet; and one smaller, called the Inje, or Tabak-sou, which flows through the little lakes Moan and Emir, at an elevation of about 4000 feet. These are all usually dry in summer, as are also the Ala Dagħ and Enizy, which fall from the south-western spurs of Ala Dagħ, from an elevation of about 4000 feet; the beds of these streams are covered with trachytic blocks, brought down from the mountains by the force of the torrent in the spring. Other small affluents fall from the mountains into the Sakaria, from the right bank in its upper course; in its lower course it has only one affluent of any importance, the Bedre Tchah, the ancient Gallus, a continuation of the Aine Gheul river, which flows through the small lakes of that name, as well as lake Yeniker, which, lying among the northern spurs of Mount Olympus, are noted for their beauty. The Sakaria, in its lower course, approaches within less than five miles of lake Nicomedia; but its bed has greater elevation.

The Moulitch has its principal source in the north-western valleys of Ak Dagħ, and flows in the valley formed by the long-extended line of Kadga Dagħ and Mouzlouk Dagħ; it flows through the little lake Suriaou, at an elevation approaching 3000 feet; receives numerous small affluents, principally from the mountains on the right, in a westerly course of about fifty miles in direct distance, when it receives a small stream from the pass of Ouzoun Yaila, and turning to the north, waters the plain of Balikesri, about 2000 feet in elevation, beyond which it passes through the defile of Demir Kapoussi (the Iron Gate), to the north of which it opens on the plain of Moulitch, to the right and left of which are the lakes Apolonya and Maniyas. The waters of these lakes have connexion with the Moulitch or Susugurli-sou; but this is probably intermitting and dependent on the season.

Lake Apolonya, the ancient Apollonia, may have an area of thirty square miles, and circumference of about thirty-five; its elevation above the sea is about fifty feet; it has one principal and other smaller islands, and is traversed by the Adramas Tchah, or Rhyndacus, which, rising on the north-western slopes of Ak Dagħ, near the sources of the Pursak, may have a course of 150 miles; it receives numerous small affluents from the valleys on the south of Olympus, and one more considerable from the left, the Bolal, or Guene, which opens communication with the upper valley of the Moulitch and the pass to the west of Ak Dagħ, in its course of four miles between lake Apo-

lonya and the Moualitch, it is called the Ouloubad. Maniyas Gheul has an area of fifty square miles, and circumference of fifty-five; it lies in a low, marshy plain, scarcely above the level of the sea, receives several small streams, and is traversed by the Karadere-sou, the river of the Black Valley, by which, in a course of fifteen miles, it is united to the Moualitch.

The Kaz Dagħ or Alkayassi-sou, rising in the granitic range of that name, within ten miles of the Gulf of Adremid, flows, in a northerly course of fifty miles in direct distance, into the Gulf of Sighadjik, thus nearly separating the Troad from the rest of Asia Minor, it is rapid, and receives many small streams.

The Kadja, falling into the Sea of Marmora, and the Mendere into the Bosphorus just within its mouth, are the only other rivers of the north-west angle of Asia Minor, though numerous streams fall from every height. The first is formed by the junction of three streams, one of which is the Granicus of the ancients; the second rising in the northern semicircular slopes of Mount Ida, from four sources; in direct distance, its course westward is forty miles, and receiving numerous affluents, among which the Kirk Gheuz, or Forty Eyes, rises from numerous small, sparkling thermal springs. This river is the ancient Scamander, and flows through the plains of Troy in a network of streams, by which it is connected on the left with the Ægean Sea.

Near the southern angle of the Troad is the Touzla, or salt river.

5 *The Rivers of the West and South.*—Two considerable streams fall into the Gulf of Tehandaryk: the Madara, flowing from the south-western spurs of Bouglouk Dagħ, flanked by the granitic chain of the same name; and the Bakyr, which, rising in the slopes of Kadja Dagħ and the Ouzoundja Yaila, opens communication with the Moualitch on the north, and the Gudjuk on the south—i. e., between the Gulf of Smyrna and the Sea of Marmora. At the mouth of this river the shore is covered with salt lagoons.

The Guldis rises in Ak Dagħ, near the source of the Adramas, at an elevation of about 5000 feet, about twenty miles below the pass of the same name; flows through a defile having an elevation of little more than 1500 feet, and receives several affluents, principally from the right, before entering the plains at Adala; at the confluence of the Demirdji its elevation is about 575 feet; its upper course is therefore extremely rapid and winding, through the region Catacaumaene, or burning land of Phrygia; in its middle course, it receives the Einegueni from the south, which, rising in the northern water-shed of the valley of the Bouyouk Mendere, or Meander, opens communication with the valley of that river in its middle course; the elevation of its source may be about 200 feet, and its course in direct distance forty miles. On the north, the Gudjuk, already mentioned, opens its valley to the lower course of the main stream; it may have a direct length of fifty miles, which, from its confluence, continues its westerly course for twenty miles, and then bending to the south for fifteen more, falls into the Gulf of Smyrna; its entire length probably exceeds 200 miles; the direct distance from its mouth to its source may be estimated at 150; this river, also called Sarabat, is the Hermus of the ancients; its delta forms extensive marshes, and may be ten miles in length by seven in breadth.

Numerous small streams fall into the gulf, which, bearing in suspension vast quantities of carbonate of lime, form incrustations on rocks and buildings in their passage.

The Tahtaly, a little stream, opens communication between the Gulfs of Smyrna and Scala Nuova, into which latter the Koutchouk Mendere, Little Meander, the ancient Cayster, flows through the narrow valley between Mounts Tmolus and Missoguis, from which, in its upper course, it receives many small streams; its middle course is slow but deep; near its mouth it stagnates among marshes; its direct length is about seventy-five miles.

The Bouyouk Mendere, or Great Meander, rises from two sources—one on the small lake Hoiran, in the plain of Dincir, at an elevation of above 3000



feet; the other, in the defile to the south-west of the spurs of Sultan Dagħ; on the plain it is frequently lost in marshes, but on leaving it, the river enters a deep winding gorge, beyond which it flows through level sandy plains to the sea; it receives the Yendere-sou and Kara-sou, which drain the great amphitheatre of Boz Dagħ from the left, and the Bana-sou, which, with its affluents, drains the valley of the southern spurs of Mourad Dagħ from the right; in its lower course it also receives from the left the Tchinar Tchai, the sources of which are not more than ten miles from the Gulf of Kos. This river, in direct length, may be 150 miles; by its windings, more than 200.

The southern rivers in Asia Minor do not, in Lycia, much exceed 100 miles in length; their courses are extremely circuitous and rapid among the rugged spurs of the mountains. The Doloman Tchai rises in Masta Dagħ, which attains an elevation of nearly 10,000 feet; its upper course is north and west, its lower south and east; it is in winter a deep and rapid torrent. The Ak Tchai, by some considered an affluent of the Kodja Tchai, the ancient Xanthus, and to which many other streams contribute their waters, rises in Kizildja Dagħ, which is 10,750 feet above the sea; at the angle made by its southerly trending, in about its middle course, it has 1000 feet elevation. The Ak Dagħ gathers its waters from numerous streams falling from the slopes of the southern watershed of the lake district, especially in passing Pamboukorassi, *i.e.*, the cotton plain; this is the ancient Cestrus, and was formerly navigable, as was also the Kempre-sou Eurymedon, which has its sources in Dispoiras Dagħ, at an elevation of more than 4000 feet above the sea; its upper course is rapid, its lower through marshes, which occupy the site of the ancient lake Capria; the elevation of its principal source, in the Isbarta pass, may be 3250 feet, and it falls into the Gulf of Adaliya.

The Ermenek-sou drains the valleys of the north-western spurs of Ala Dagħ; in its upper course it has an elevation of 2000 feet; but at the confluence of its principal source, not more than 150; from hence, in forty miles' direct distance to the sea, it flows through a narrow valley, shut in by precipitous rocks, with a very circuitous course; it has numerous affluents, but those from the right are alone important; it is the ancient Calycadmus. The Tarsus, ancient Cydnus, is to be noted for the Alpine wildness of the gorge through which it flows; its mouth is deep, though not broad. The lake of which Strabo speaks has disappeared.

The Seyhoon, as already noticed, rises from two principal sources, at an elevation of about 6000 feet, in the valley between, and in that to the west of, the chain of Anti Taurus; in its upper course of about 120 miles it is increased only by the waters of small streams; from the confluence of its two sources it follows an irregular winding course of about eighty miles in direct distance to the sea; it has only one important affluent, the Karabounar Tchai, from the mountain of the same name on the right.

The Djeihoon has, in its upper valleys, a very irregular course, winding among the spurs of the mountains, which link those of Armenia and Asia Minor to the coast range of Syria; the greatest elevation of its sources does not probably exceed 3000 feet; it is rapid, and has formed at its mouth, in the Gulf of Scanderoon, a considerable delta.

## CHAPTER X.

## OF EUROPE.

§ 1. Sources of our knowledge.—2. Extension of geographical knowledge.—3. More recent information.—4. The boundaries and limits.—5. The coast line.—6. The watersheds.—7. The orographical classification.—8. The classification of rivers.—9. Of the geological formation.

**SOURCES of our Knowledge.**—When, towards the end of the ninth century of the Christian era, our great Alfred translated the Geography of Orosius, little was known of the portion of the world which we call Europe beyond what had been ascertained by the Greeks and Romans. The latter knew little beyond the 'Agri decumates,' between the Rhine and Danube, the limits of which extended from Coblenz to Ratisbon, the north-west boundary of their empire; Dacia, shut in by the Carpathians, was its limit to the north-east. Though some general knowledge of the countries stretching from the Baltic to the Black Sea had been obtained by Ptolemy and his successors, and of the islands of the Atlantic belonging to Europe some ideas had been acquired, these were very general and indefinite. (See 'Ancient Geography,' chap. 8.)

The erratic propensities of the northern inhabitants of Europe had, however, in the time of that monarch, brought them into communication with the people of Western Europe, especially those of France and Britain: and from Otho, a Norwegian nobleman who found refuge at his court, he obtained a knowledge of the limits of Norway to the north, of Lapland as far as the White Sea, and of the Baltic and its shores.

From the Travels of Wulfstan the Norman, Alfred also obtained a knowledge of Prussia, Poland, and Gotland, extending to the Gulf of Finland, and the interior of Russia.

In the seventh century the Northmen had extended their voyages to Ireland. In the ninth and tenth, Iceland, the Hebrides, and the Shetland and Feroe Isles were taken possession of by them; yet till the middle of the twelfth century the piratical habits of the northern nations, especially those inhabiting the shores of the Baltic, prevented the more civilized people of Europe from becoming better acquainted with them: but in the end of the twelfth and beginning of the thirteenth centuries, the Swedes, having embraced Christianity, turned their arms against their heathen neighbours, in order to impose on them their newly adopted faith, with the ardour natural to new converts; and at the same time the Germans raised a crusade, so to speak, against the Pagans residing in Prussia.

We owe therefore our first accurate knowledge of the north of Europe to the missionaries who preached in Slavonia and the coasts of the Baltic. Of these, S. Boniface, Otho, Bishop of Bamberg, and Anscaire, are to be noted; the latter travelled through Sweden and Norway, and to his account subsequent writers were indebted for their knowledge of those countries.

The adventures of travellers and the wonders they have witnessed, have always been the most interesting materials for the writer and storyteller, and have not unfrequently been the basis of fiction; but they have also incited others to pursue the paths opened and discover new ones, and thus even exaggeration and falsehood have assisted in the discovery of truth.

The feudal system led to the survey and compilation of topographical accounts of those countries in which it was adopted. William the Conqueror in England in the twelfth; Waldimer of Denmark, in the thirteenth; and Charles the Fourth of Germany, in the fourteenth century, had their dominions carefully surveyed. Of the labours of those employed by the first, Domesday Book is a record, but these were for the purposes of government,

and were topographical and statistical. Of the details much was known; of the general forms and limits of countries men were still ignorant, and maps were not unlike the accounts of travellers filled with matters selected either on account of their interest to the compiler, or as likely to excite the astonishment of the reader. Cities and monasteries, mythological stories and monsters, cover the surface, from which the natural features of the country are omitted. It remained for the astronomers and mathematicians of the sixteenth century to give their powerful aid to the geographer, and by establishing certain points with accuracy, enable him to deduce others from them with some approximation to truth.

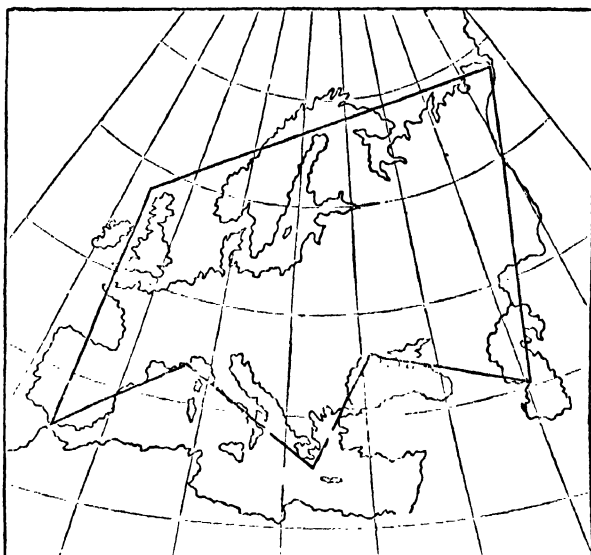
2 *Extension of Geographical Knowledge.*—Science had enabled the Alexandrian philosophers to calculate latitude with some approach to accuracy, but longitude was beyond their reach. The difference between the calculations of Eratosthenes and Ptolemy in estimating the distance from Cape St. Vincent to Syracuse being 17,200 stadia (see 'The Mediterranean,' by Admiral Smyth, p. 4, sec. 1), and even from the fifteenth to the seventeenth century differences of longitude not less remarkable were common.

The Arabians led the way in the application of astronomy to geography; the Venetians and Genoese in accurate surveying and portraying on charts; but of their labours more will be said when speaking of the hydrography of the Mediterranean. It was not, however, till the time of Galileo that any great progress was made, and Louis XIV. witnessed the application of it in the curtailing the apparent limits of his kingdom by Picard and Delahire.

3 *More recent Information.*—From the time when science began to extend her dominion over the human mind, its administration, divided into departments, collected the results under their various heads, and like the Persian empire in olden time, its unity was violated. Science was no longer entire, and single inquiries were continued and extended in one branch almost irrespective of the others; and thus, although by division of labour much was effected, it remained for the Humboldts of our own time to unite it again, and bring something like order out of the collection of chaotic elements which had been made. Europe, our own historical ground, has therefore become known to us through the churchman and the warrior and the merchant, the mathematician, astronomer, botanist, geologist, &c., as well as the traveller. To recite names would however be a work of more labour than profit. Our knowledge of the geography of Europe, resulting from these labours, is now very extensive, not only in its general outline and topographical details, but in its meteorology and productions; it is, in short, that from which we are able to deduce laws applicable to the other portions of the world, and the result of correct averages; but it must not therefore be supposed that our knowledge, even of this our own portion of the globe, is complete. The surveys, however, made under the direction of the principal governments, as well as those undertaken for commercial purposes and international communication, are rapidly bringing it towards something like minute accuracy.

These surveys are no longer, like the Domesday and kindred works, confined to man and his occupations and productions, that they may be made subservient to the capacity of the ruler, but extended into every department of science, that physical nature may be made the handmaid of man, and contribute as much as possible to supply the wants of advancing civilization.

4 *The Boundaries and Limits.*—The western boundary of Asia having been given (p. 222), Europe may be considered as bounded on the east by Asia, the Black and Caspian Seas; on the west by the Atlantic Ocean, on the north by the Arctic Ocean, and on the south by the Mediterranean and Black Seas, and the line of the Caucasus mountains; or generally the north shore of Europe is the limit of the Arctic basin, the west of the Atlantic, and the south of the Mediterranean. Referring to the table (pp. 204-5), for the positive limits of Europe, the same comparisons between the normal figure and the extreme points may be instituted that have been already made with respect to Asia.



Lewis Western Isles	58°30' north latitude	6°14' west longitude
Gulf of Kara . . .	67°30' "	67°30' east longitude
Cape Apcheran . . .	40°12' "	50°20' "
Odessa . . . . .	46°28' "	30°44' "
Cerigo . . . . .	36°9' "	22°59' "
Nice. . . . .	43°42' "	7°17' "
Gibraltar . . . . .	36°7' "	5°21' west longitude

From this it will be seen how far in every direction the development of Europe extends beyond the normal figure. The mean area of Europe has already (p. 205) been given as 3,732,540 square miles.

5 *The Coast Line.*—The irregular trending of the coast of Europe is apparent from the above comparison. Yet it may be remarked that even in this irregularity system is observable, for while the great peninsulas to the south—Greece and Italy—have their principal extensions to the south-east, the islands Corsica and Sardinia have theirs to the south, and Spain to the south-west. So that they appear to point to one centre about the culmination of the Alps; while the outlying mountains to the north-west, whether of Scandinavia or of the British Islands, have the same linear extension as the north coast of the Spanish peninsula and the secondary chains of western Europe. The irregularities of the outline of Europe result rather from indentations than projections; its inland seas and gulfs being its most marked features, and conferring on it its maritime character; and in this consideration the mistake of separating it from Africa and Asia, and not therefore viewing the basin of the Mediterranean in its integrity, must be apparent. On the north the White Sea, on the west the German and Baltic Seas and Bay of Biscay, and on the south the Gulfs of Lyons and Genoa, the Adriatic, the Sea of the Archipelago, the Sea of Marmora and the Black Sea, with the Gulf of Odessa, and Sea of Azov, give a coast line of unprecedented length compared to the area it encloses.

According to the calculations in the portion of the work devoted to

physical geography, the proportion between the area and coast line would be 205, the former being estimated at 3,550,000 square miles, and the latter at 17,250 linear miles. The principal projections and indentations may be estimated as follows:—

Indentations.		Projections.	
White Sea . . . . .	5°	North Cape . . . . .	3°
German Sea . . . . .	7°	West of Ireland . . . . .	1½°
Baltic . . . . .	10°	Sicily . . . . .	2½°
Bay of Biscay . . . . .	4°	At Constantinople . . . . .	1½°
Gulf of Genoa . . . . .	2°		
Adriatic . . . . .	7½°		
Gulf of Saloniki . . . . .	2°		
Sea of Azov . . . . .	2½°		
Caspian . . . . .	4°		

These are in a linear extension of 61° 30' east and west, on the 41° parallel north latitude, and 34° 15' north and south, or 2700 and 2055 miles, of 60 to a degree, at the equator respectively; it may be noted also that these measures correspond with the extreme length and breadth of the Continent.

6 *The Watersheds*.—It has already been shown (p. 224) that the orography of Europe cannot in its general features be separated from that of Asia and Africa; yet in its more particular description it may well stand alone, not only because it forms a system complete in itself, though it be but part of a larger, but more especially because our knowledge of it is more minute and accurate than that of any portion of the world, inasmuch as to leave little to be desired in this particular, and of this the orographical contour map of Europe, published by Mr. Johnston, of Edinburgh, affords ocular demonstration. Europe, like Asia, has orographically a centre to its system, but unlike Asia that centre has an outlet; and therefore Europe naturally divides itself by the valleys of its primitive rivers, and the classification of its mountains and rivers is easy; nevertheless, the lines of its watersheds are much more intricate than those of Asia, being, as they are, much more numerous in proportion to its area, and its surface therefore much more varied; a knowledge of this can only be obtained by first considering how its mountains may be classified.

7 *Of Orographical Classification*.—Mr. Johnston divides the mountains of Europe into six systems, the Hesperian, the Alpine, the Sardo-Corsican, the Sarmatian, the British, and the Scandinavian, including the whole of Europe from the Black Sea to the Atlantic in the second; the reason for this arrangement is not at first sight apparent, or why the Vistula should be the boundary of a system any more than the Danube, the Rhine, or the Rhone. M. Elie de Beaumont has divided the mountains of Europe, according to their geological construction or consequent probable period of elevation, into twelve principal, or twenty-two subsidiary, systems; but it must be obvious that such a classification, however valuable in its physical application, will scarcely answer the purposes of descriptive geography. The following extract from Mr. Johnston's recent edition of his 'Physical Atlas,' will show that the plan already adopted in this work is best adapted to the purpose in view, viz., the obtaining a comprehensive knowledge of the orography of the world.

'If an observer, placed on the summit of Mont Blanc, could so extend his vision as to embrace at one view the whole of Europe, he would find his position to be the culminating, and nearly the central, point of a long range of mountains, commencing at Cape St. Vincent on the west, and terminating at Capo Matapan on the east. He would perceive that several branches detached from the main chain traverse the Iberian peninsula, and that a formidable barrier rises between France and Spain. At the portion of the system nearest himself he would see it separating France from Italy; covering Switzerland and the Tyrol with its ramifications, and extending south-east into Albania, where it forms one of the shores of the Adriatic, the other side

of which is enclosed by the remarkable chain of the Apennines. Beyond the Gulf of Genoa, and in the same direction, he would notice two great islands, formed by a chain of mountains extending due south, and cut into unequal portions by the sea. Farther east, he would remark in Sicily a continuation of the Italian chain crossing near Nicosia, and giving to the island a triangular form. On the southern frontier of Servia the chain bifurcates, one branch taking a southerly direction towards Greece, while the other bends east and south-east to the shores of the Black Sea. North of the latter branch he would distinguish a range of mountains, which first stretches in a direction perpendicular to the course of the Danube, and is cut off by that river near Orsova; it then curves, so as to embrace Transylvania; it then recurves, so as to envelop Transylvania, Hungary, Moravia, Bohemia. To the west of these, several small groups of hills are distributed over western Germany; but, beyond these slight elevations, he would perceive only vast undulating plains, extending to the shores of the Baltic and North Seas. Beyond these seas, in the west, he would descry the hills of Wales and Scotland, and in the north the mountains of Scandinavia—the latter blanched by perpetual snows, due less to elevation than their proximity to the pole. If the supposed view was enjoyed during the heat of summer, when the snow is melted on the lesser heights, the brilliancy of those on which it always rests would distinguish the most elevated summits.

Without accepting this view, which Mr. Johnston adopts from the work of M. Bruquière, further than as an evidence that, geographically, all systematic arrangements should be made from the outward appearance or present condition of the surface, rather than from geological or other considerations, and noting, by the way, that such a view of the orography of the whole world has been attempted in the atlas attached to this work, the subdivisions of this arrangement may be stated:—

Systems.	Divisions.	Culmination.	
1. Hesperian	1. North chain, or Pyrenees	Pic Nethou	11,168
	2. Central, or Cantabrian	Sierra Gredos	10,552
	3. Southern, or Betican	Cerro de Mulhacen	11,663
2. Alpino		Mont Blanc	15,744
	1. Bernese Alps	Finster Aar Horn	14,026
	2. Vorarlberg	Hochapitze	10,330
	3. Carnic and Julian Alps	Mount Marmolata	9,802
	4. Jura	Le Molesson	6,584
	5. Gallo-Francian	Puy de Saney	6,220
	6. Apennines	Mount Etna	10,874
	7. Selavo-Hellenic	Mount Athos	9,628
3. Sardo-Corsican	8. Hercinio-Carpathian	Mount Butschitjo	9,258
		Mount Olympus	9,749
4. Sarmatian		Valdai Hills	1,100
5. British		Ben Nevis	4,368
6. Scandinavian			8,500

The main mass of the primary watershed of Europe extends under the parallel  $33^{\circ}$  north latitude, from  $7\frac{1}{2}$  to  $14\frac{1}{2}$  east longitude, and from this all the mountains of Europe may be considered as originating. Here, in close proximity to each other, rise the primary sources of the Danube, the Rhine, the Rhone, and the Po; the secondary sources of which have their rise respectively in the German mountains and those of France, which form the watershed of the secondary rivers which flow through those countries; and in the Apennines, which, extending to the south-east, in the peninsula of Italy, form the watershed of its rivers. Beyond, to the east, the primary chain stretches to join the Caucasus, its southern spurs, developed in Greece and the islands, trending towards the western extension of the chains of Taurus in Asia Minor; to the west, those of Pigeum, if, with M. de Beaumont, we consider them to correspond to the Apennines, will be an extension of the secondary chains; but if, as

seems more natural, they are considered as a continuation of the primary, then the extension of these must be estimated as from Gibraltar to Cape Matapan, in a semicircular arc, having a chord of 1400 miles, and a versed sine of 600 miles.

The secondary mountains of Germany will be found extended to the east, in those of Bohemia and Hungary, from which flow the secondary affluents of the Danube, while from their northern slope the important secondary rivers of Germany descend to the Baltic, their secondary streams falling from the mountains of the Nether Rhine and the Hartz, from the northern slope of which the tertiary rivers fall in the same direction. This watershed has its eastern extension in the plains of Pomerania, and to the west joins the Ardennes, which have their extension in the mountains of Brittany. To this system will also belong the British and Norwegian mountains, and possibly some of the mountains of the west coast of Spain.

The mountains of Europe may, therefore, be thus arranged:—

Primary Watersheds.	Secondary Watersheds.	Tertiary Watersheds.
The Alps	The Cevennes Vosges	The Nether Rhine and
The mountains of Dalmatia	Jura and Schwarzwald	Hartz mountains
The Balkans	Bohemian and Carpathian mountains	The mountains of Wales, Scotland, and Scandinavia and Brittany
Pindus	Sierra Monchique	
Pyrenees	Sierra Gerez	
Sierra Cuenca	The Apennines	
Sierra Nevada		

Of the primary watersheds, the Sierra Guadarama, the Sierra Morena, the Sierra d'Estrella, and mountains of the Asturias, may be considered spurs, as may the Erzgebirge, Thuringerwald, and Bohmerwald, of the secondary.

The hills of the coasts of England and France, of Germany, and the Valdai hills in Russia, cannot be considered as appertaining to any of these systems.

8 *Classification of Rivers*—Europe has been shown to have four primary rivers:—

The Danube, the basin of which extends into the Black Sea.

The Rhine, having the extension of its basin in the North Sea.

The Rhone, falling into the Gulf of Genoa.

The Po, the valley of which is extended in the Gulf of Venice.

None of these rivers have the remarkable double character which belongs to the Asiatic, although their deltas, especially that of the Po, are very considerable.

To the above it may be added that, if the Pyrenees are considered as primary mountains, all the rivers of Spain and Portugal must be classified accordingly—the Douro, Tagus, Guadiana, Guadalquivir, falling into the Atlantic Ocean; the Sigura, Jucar, Guadalaviar, the Ebro—the valleys of which extend into the Mediterranean—and possibly even the Minho.

The small rivers of Greece and Turkey must also be placed in this class. The Vardar, Struma, and Maritza; as well as the Kuban, which falls into the Sea of Azov; and the Tereck and Kuma, which fall into the Caspian.

The secondary basins to the south of Europe being in fact occupied by the Mediterranean, the primary rivers to the south are of course small in proportion.

The secondary rivers of Europe are the Seine, the Loire, and the Garonne, their valleys extending into the English Channel and Bay of Biscay.

The Elbe, extending into the North Sea; the Oder, the Vistula, into the Baltic; the Dniester into the Black Sea.

The tertiary rivers are the Adour, the Charrent, falling into the Bay of Biscay; the Meuse, the Scheldt, the Ems, the Weser, the Thames, Humber, and other rivers of the east coast of Great Britain, into the German Ocean; the Pregel, the Memel, the Vistula, the Duna, the Dahl, and other small rivers, falling into the Gulfs of Finland and Bothnia; the Stor, into the Skag-

gerack; the Severn, the Clyde, the Blackwater, the Barrow, and Liffey, falling into St. George's Channel; the Shannon into the Atlantic Ocean; the Bug, the Dnieper, the Don, which flow into the Baltic and Sea of Azov; the Volga and Ural, which extend into the Caspian. The characteristic feature of the hydrography of Europe is, therefore, the number and importance of its tertiary rivers, which would admit of further classification, should it prove desirable.

This characteristic corresponds to what might be expected from the comparison already instituted between the area, coast line, and normal figure of this division of the eastern continent; and shows how every portion of its surface is made available for the use of man, no less than that its great irregularity and diversity of surface make it most fit to develop all the qualities, mental or physical, which have been conferred upon him.

9 *Of Geological Formation.*—The irregularity of the surface of this division of the eastern continent indicates the variety of its geological development. On the north-east, the primary stratified rocks extend from the Oural mountains to the Arctic and White Seas, the Gulf of Finland and the Baltic, upon which the rocks of secondary formation occupy the larger portions of the basins of the Dwina and Volga; and upon these again tertiary formations extend from the steppes of the Caspian to the Baltic, and along the shores of the German Sea, the secondary strata reappearing on the slopes of the Caucasus and Carpathians, and extending through a considerable portion of Germany; they also reappear on the north shores of the Mediterranean, in Illyria, Italy, and Spain, and between them the earlier rocks have been thrust upwards, forming the watershed of the country. The primary strata also show themselves partially in north-west Germany, at the south-west angle of the Black Sea, on the north slope of the Pyrenees, at Cape Finisterre, and in Portugal more considerably; in Ireland, Wales, the north of England, and north-west of France; partially in Sweden and Norway, almost the whole surfaces of these countries, as well as of Lapland and Finland, consisting of unstratified rocks, which are extended to Nova Zembla and Spitzbergen, on the east shores of which the primary strata are again found. The unstratified rocks also prevail in the north of Scotland and Ireland, in the west of England, in the north-west and south-east of France, in the centre of Spain and Portugal, along the lines of the Alps, Balkan, and Bohemian mountains, and the south flank of the Carpathians. The tertiary system of the south and east of England is correspondent to that of the north and west of France.

Throughout the centre of Europe the volcanic rocks make their appearance occasionally, as they do in the west of Scotland and north of Ireland. Active volcanic operations are at present confined to the south coast, to Italy, Greece, and the Islands, but the remnants of extinct volcanic action and crateriform basins are of frequent occurrence. The most remarkable of the districts of ancient volcanic action is that of Auvergne, in France; of those not in the immediate proximity of recent volcanic action, but which have suffered from earthquakes, Lisbon, Constantinople, Hungary, and the lower valley of the Danube, Switzerland, especially Basle, the lower valley of the Rhone, Saxony, and the Rhine valley, and Auvergne. The north-west of France and England also appear to have had their full share in number if not in severity. A list of all the recorded earthquakes may be found in the 'Transactions of the British Association,' but it is probable that many of the earlier, chronicled only at one place, may have had considerable extension, as we find almost all the later to have had. There is probably no portion of this division of the world which is not subject to earthquakes.

The axis of elevation, as at present observable in the northern parts of Europe and Asia, is north-east and south-west.



## CHAPTER XI.

## THE PRIMARY WATERSHED AND THE RIVER DANUBE.

1. The primary watershed of Europe.—2. Its eastern extension.—3. The Danube and its primary affluents.—4. The secondary watershed of the north.—5. The secondary affluents.—6. The Scrath and Pruth.—7. The valleys of the Danube.

**THE Primary Watershed of Europe.**—Although Mount Blanc is the highest summit of the Alpine system, Mount St. Gothard must be considered its centre, and here therefore, as in the Himalayas, we find the most elevated peaks in advance of the main chain. The central Alps, extending from Mount Furca to Mount Cinnols are, indeed, the primary watershed of Europe; for from them rise the principal sources of the four great primary rivers of that division of the surface of the earth. This chain, extending for about fifty miles from east to west, rising like the curtain of a mighty fortress, is flanked by double bastions at either end; on the north-east the Noric Alps culminate in the Gross Glockner at 13,000 feet above the sea, and on the south-east the Rhaetic Alps descend from the Ortler Spitz, which has an elevation of 12,852 feet, and Mount Adamello of 10,980, into the plains of Italy. Between these the sources of the Adige and the Drave are in close proximity, their main streams being parted by western spurs of the Dinaric Alps. On the west the more lofty peaks of the Bernese Alps culminate to the north in the Finsteraar Horn, having an elevation of 14,100; the Jungfrau and the Shreck Horn are respectively 13,718 and 13,386; while to the south and west, Mount Rosa and Mount Blanc attain the greatest elevations throughout the whole system; the former of 15,208 and the latter of 15,810 feet above the sea.

The sources of the Rhine, the Rhone, and the Po, fall from opposite slopes of the same passes on the west; as those of the Rhine and the Danube do from the passes on the east. The two ends of the chain of the central Alps have further similarity. On the east Mount Maloja, rising 11,483 feet above the sea from a rectangular base, having its greater length from east to west, is buttressed up by the Septimer on the north, the Bernina on the south, the Cinnols on the east, and Forcola di Mezzo on the west. The line of water-parting crosses the Septimer and Bernina, which rise respectively 9744 and 7969 feet; and, from the depression between, the waters of the Inn and the Maira fall, to join the main stream of the Danube and Po, through the transverse valleys of the Engadine and Brigaglia, separated by the gorge of the Bernina, rising 7672 feet above the sea. On the west likewise the Saint Gothard rises, its more massy form 10,595 feet from its base, which is also rectangular, and facing, like that of the Maloja, the cardinal points, but having its longer axis from north to south; its giant supporters are, to the north the peak of Gallenstock, to the south Mount Rovina, on the east Mount Nera, and on the west Mount Furca. This latter is the highest of the whole range, rising 14,037 feet above the sea, the others having their culmination respectively at 12,481, 9843, and 10,499 feet. The group of St. Bernard, like that of the Maloja, encloses two valleys, those of the Tessin and Reuss—the Levantine and the Valley of Urseren; while two others stretching east and west separate it from the Bernese and the Pennine Alps; the pass of the St. Gothard, connecting the valleys of the Tessin and the Reuss, has an elevation of 6808 feet.

The principal passes beside those already named are the Splugen, between the source of the Upper Rhine and that of the Ticino, having an elevation of 6814 feet; and the Bernardin, forming another line of connexion between the same valley, rising 6970 feet, which it connects with the Valteline and the Engadine.

The central Alps throw off to the north three great spurs; the Grisons,

forming the watershed between the east sources of the Rhine and the Danube, and which, bending to the north-west round Lake Constance in the Vorarlberg, join the Schwartzberg, and form the water-parting between the Rhine and Danube; that which forms the mountain region about the lake district of Switzerland, and separates the head waters of the Rhine, of which Mount Dach is the most prominent feature; and the Krisfeld, which separates the Reuss from the Lower Rhine, the course of which it follows, bending north-east to Dodiberg, where, attaining an elevation of 11,765 feet, its numerous ramifications enclose the valleys of the tributaries of the Rhine.

Unlike the upper valleys of the Himalayas, those of the Alps are narrow, rugged, deep defiles, through which the torrents rush with fearful rapidity and hoarse roar: they may be compared to the lower valleys of the Asiatic mountains. The Engadine, the most extensive of all, is only one and a half mile in width, and 5753 feet above the sea. The lower level of perpetual snow is 8900 feet, but the glaciers descend as low as 3400; these are estimated as extending over a surface of 1500 square miles. In the range of the central Alps above 400 glaciers have been reckoned, varying from three to twenty-one miles in length, from one to two and a half in breadth, and from 100 to 1000 feet in thickness.

The valleys of the Alps are fertile, abounding in pasture; wheat is raised at an elevation of 3600 feet; the oak is found at 5400; pines, and other coniferæ at 6500; while the Alpine rose, and the saxifrage, blossom on the edge of the perpetual snows.

The central Alps are formed of primary rocks, principally granite and gneiss, flanked by limestone, sandstone, and slate. The southern slope to the valley of the Po is very precipitous, the angle of inclination to the north being much greater.

2 *The Eastern Extension of the Primary Watershed.*—The Alps of the south-east, like those of the south-west from St. Gothard, project from Mount Maloja in a circular arc of about 373 miles in extent, forming the basin of the Adriatic; these are the Carnic and Julian Alps. Of these, as well as the Noric Alps, the Dreyhernspitz is the central point, as Mount Gebatsch rising 12,366 feet, between the sources of the Inn and Adige rivers, forms the point of junction with the Rhaetic Alps. This mountain has above 10,000 feet elevation, but the Gross Glockner, which projects from it to the east, and is the culminating point of the Noric Alps, rises to the height of 13,100.

Through the Rhaetic Alps three passes connect the valley of the Inn with those of the Adda and Adige. The gorges of Rescha and Tschirf, having an elevation of 4659 and 6906 feet respectively, unite at Glurns on the Adige; these are extremely difficult and dangerous, but that of the Brenner, between the Inn and the Eisach, having an elevation of 4757 feet, is passable for carriages throughout the year.

To the north, spurs from the Dreyhernspitz, forming a confused mass of mountains, with narrow and precipitous valleys opening to the north and east, enclose the sources of the Inn and Salza, and separate those rivers; their summits exceed 11,000 feet in elevation. The Noric Alps in like manner separate the Salza and the Drave. These form a rugged and impassable barrier, covered with perpetual snow; and at Mount Eland, assuming a north-easterly direction, pass into the Styrian Alps, which culminating in the Eisenhut at an elevation of 7656 feet, throw out spurs to the north and east which reach the banks of the Danube, leaving scarce room enough for a road between; then turn, and bending in an arc of a circle round the Raab, again trend north and east between the waters of that river and the Balaton See, when it is known as the Bakonywald; and round its base the waters of the Danube change their course from east to south at a right angle, while another branch extending east round the Balaton See forms the north watershed of the Drave. The Styrian Alps are crossed by several roads, but have no passes, properly so called, the mountain mass being continuous. The Carnic Alps bend south and south-east to Mount Terglou, 9380 feet in height, but their

culminating point is Mount Marmolata, which has an elevation of 11,509. A spur from these mountains separates the rivers Drave and Save. They are traversed by three principal passes, the gorges of Tolbad, Tarvis, and Bredil. The former unites the valleys of the Eysach and Drave, and the two latter those of the Tagliamento and Isonzo with that of the Villach, all leading direct from Italy to the middle valley of the Danube.

From Mount Tergrlou the Julian Alps take a south-east direction for 100 miles to Mount Kernica broken only by the pass of Adelsberg, which establishes a threefold communication between the river Isonzo and the Gulfs of Trieste and Quarnero with the valley of the Save. The Dinaric Alps continue the same line along the shores of the Adriatic, to which their descent is very precipitous, for 370 miles, to Mount Seardo or Scharratagh, having a mean height of about 5000 feet, but culminating in Mount Kom at 9000. Mount Seardo is estimated at 9843; Mount Dinara, 7458. This range is noted for a peculiarity, in which it assimilates to those further east, in that its spurs extending to the east, while they form the watersheds of the lower primary affluents of the Danube, also enclose plateaux or mountain valleys, some of which are twenty miles in extent, and which have no visible outlet for their waters. They form a rugged and difficult country, still but little known to the rest of the world. One solitary pass, to the east of Seardo, unites the valleys of the Morava and the Vandar, traversing the chain from north to south.

At Mount Seardo the Balkan chain commences, and extends to Cape Eminch on the Black Sea, a distance of nearly 400 miles from Despoto-dagh. The chain, Eminch-dagh, or Greater Balkan, trends east and north round the sources of the Maritza; and from thence it divides and sends out three spurs, one assuming a northern direction, terminates in Cape Kalakria; another having an easterly direction, and enclosing the valleys of Kamtchuk and Varna, extends to Cape Eminch; and the third, the Kutchuk Balkan, passing south-east to the north of Constantinople, forms the north-east boundary of the Bosphorus.

The Balkan throws out several considerable spurs to the north, the principal of which extends from the Egrisou-dagh (the Orbulu of the ancients) to the Danube, where it meets the opposing spurs of the Carpathians. This may be considered as a continuation of the transverse chain already noticed as forming the watershed of the Maritza, both having a common centre and a general north-west and south-east trending. A defile near the Egrisou-dagh unites the upper valley of the Isker and Morava; while that of the Souju Derbend to the south unites the former with that of the Stromna; and immediately to the east another unites the latter valley with that of the Maritza. As the pass of Trajan's Gate, or Kapuli, opens a communication between the Maritza and the Isker, this point is therefore the key to all these valleys. Farther east, the pass of Kersánlisk unites the valleys of the Jentra and the Toondja, affluents of the Danube and the Maritza, not far from which that of Selimno, or Islamieh, affords access between the Toondja and the Kamtchuk. More easterly still the Borghaz connects the valleys of the Kamtchuk and Borghaz Bay; and lastly near the coast the Djezieh pass traversing, like that of Borghaz, the central range, opens a communication between Varna and Borghaz. As the northern spurs of the Balkans approach those of the Carpathians, so the Styrian Alps approach the Czerhatz mountains, and the Hansruck the Bohmerwald, thus dividing the course of the Danube into three principal basins, in addition to the plains and marshes about its lower course.

3 *The Danube and its Primary Affluents.*—It has been already noted that the secondary source of a river, or that rising in the depression which is usually formed between its primary and secondary watersheds, as affording the easiest passage into the opposite river valley, is the earliest and best known; and therefore gives its name to the united stream. In Europe, the Danube is a striking example of this, taking its name from the Donau, which rises on the slopes of the Schwartzwald, the connecting link between the

primary mountains of Switzerland and the secondary chains of Germany. Of the other sources of this river, those between the Donau and the Inn have their rise in the spurs from the primary mountains which form the watershed of the Rhine on the one hand, and the Inn on the other. The Inn, therefore, as the first source of the Danube rising on the primary watershed, would be entitled to the honour of being considered the principal source of that river; but this is not its only claim, were it so the theory on which that claim is based would be vain. It has others which confirm it, viz., it has its source at an elevation of above 6000 feet, while the fountains of the Donau are only 2850 feet above the level of the sea; it brings down, after the junction of the Salza, a far greater body of water than the Danube, has much greater rapidity of current, and is at the confluence of the two streams 750 feet wide, while the Donau is only 492.

Assuming, then, the river Inn as the main source of the river whose united waters bear the name Danube, the description of the river must commence with it, leaving the other and more western to be described among the secondary affluents.

This river has its sources in the north face of Mount Maloia; the mountain streams which form them collecting in the Sils See, a small lake in the Engadine Valley, about four miles in length and one in breadth, and 5964 feet above the level of the sea. Flowing north-east through the Upper Engadine, it receives an affluent from the east, and issuing from the valley after a course of forty-five miles, it receives an affluent from the east slope of the Vorarlberg, and thence, trending, under the influence of the spurs of that range, which form the watershed of the Lech, it flows onward, receiving accessions to its waters only from the mountain torrents which precipitate themselves from the Rhaetian Alps. Here it again assumes a north-east direction, and becomes navigable, the valley still more open towards the east. Bending again to the north, it receives a considerable affluent, the Aiblitz, from the east, which has its sources in lakes among the mountains to the north of Mount Solstein. Here the country opens, and its surface is wooded, forming the forest of Hohenlinden, extending fifteen miles in length by four in breadth. On the right, the river is still closely confined by mountains, which form the basin of the Chien See, and the watershed of its affluent, the Alz, from the right, which is formed by the surplus waters of the Chien See, or lake, celebrated for its fish, in length twelve miles, and in breadth nine, and having an elevation of 1549 feet above the sea; it has three islands, and receives the waters of the Achen and Prien, the latter of which has its origin in one of the smaller lakes which are found in the district, and around the sources of the former the Salza trends to the east. Again turning east, the river changes its character, flows between low banks, and is studded with islands, which character it maintains for the rest of its course, till within ten miles of the junction of the Donau, when its channel is again narrowed between rocky banks, and, notwithstanding the volume of water it contains, is not 400 feet in breadth.

The Salza river is the most important affluent of the Inn, having its sources in the ravines of the north slope of the Dreyhernspitz and Gross Glockner, and flowing through a valley of romantic beauty, has a course of 130 miles, of which the last eighty are navigable. Four miles below Saltzbourg it receives, from the left, the waters of the Saal, a deep and rapid river, which has a course of seventy miles; and the mountains which form the watershed between it and the Salza rise to an elevation of 9843 feet. From the junction of the Saal, the Salza, though rapid, is broad and deep; it derives its name from the rock-salt found in the mountains through which it flows. About its sources are several beautiful lakes, of which the Konig Sea is six miles in length; perhaps few rivers can boast of so much beauty in so short a course, as the Salza; after its junction with the Inn, that river receives some smaller affluents, principally from the right bank; at its confluence it is only 800 feet above the level of the sea; and,

estimating the course of the Inn as 250 miles, its average fall would be twenty feet in a mile. From this point the Danube has a general easterly course, till it reaches the 19th meridian of west longitude, or, in a direct line, of nearly 250 miles, for the first hundred of which its valley is narrowed by the mountains, which approach it on either side; its affluents, during this portion of its course, are therefore inconsiderable. Of those on the right, the most important are the Traun and the Enns. The former has a course of 100 miles, and flows through the Traun, the Aller, and several other lakes; the Traun, or Gmunden Sea, is eight miles long and two broad, and 5470 feet above the sea; the latter has a course of 112 miles, and has two affluents, the Steyer and the Salza. The sources of the latter lie at the opposite point of the compass from the main sources of the Enns, at nearly 100 miles distant, their narrow valleys lying at the base of the long line of the Styrian Alps. The Steyer is famous for its iron mines; and the gorge through which it flows is as precipitous as that of the greater Salza, the affluent of the Inn. The Trassen and the Leitha are also small affluents of the right bank of the Danube; both descend from the slopes of the Weinerwald; the former rapid, shallow, and tortuous, is composed of five streams; the latter also meanders, but with a gentle current; it has a course of 150 miles.

Throughout this portion of its course, the Danube varies very much in character; below the confluence of the Inn it acquires a breadth of 2625 yards; at the north of the Krems only 656; below this point it divides into several channels, forming numerous islands, the greater volume of water flowing on the left bank. One island, 784 feet broad, separates branches 1575 and 1181 feet, respectively; while a third, 197 feet wide, surrounds an island 1969 feet in width. The island of Labau is about  $3\frac{1}{2}$  miles long by  $2\frac{1}{2}$  broad, high and well wooded, separated from the left bank by a channel averaging 400 feet in breadth, and here the river has an extreme breadth of four miles, but narrows immediately to two. Below this the river has several islands, and two anabranches; one on either side, forming the islands Gross and Kleino Shutt. The northern branch, called Neuhaesel, receives the waters of the Waag; the island it surrounds is fifty miles long by fifteen broad; the southern, the Weiselburg, receives the waters of the Leitha, which are thus united to the Raab; the island which it forms may be twenty-five miles long by five broad. This district is very subject to inundations, which frequently cover 1500 square miles of its surface; below, the river again contracts, and flows through a defile till it bends its course to the south.

The Raab flows from the east slopes of the Styrian Alps, having the Bakonywald for its east watershed, and has a course of 180 miles; thirty miles from its source it has an elevation of above 5000 feet. The principal affluents, both of the left, are, in the upper course, which is rapid, the Labnitz; and in the lower, which is marshy, the Raabnitz, which however is rather confluent than affluent. Two extensive lakes lie in hollows to the right and left of the Raab. To the north-west, the Neuseidler See, twenty-three miles long and seven broad; its waters are saline, and average ten feet in depth; the country to the west is high and well wooded, and from hence it receives the waters of the Vulka river; that to the east is low and marshy, and the surplus waters are carried by a canal to the Raabnitz. The Balaton See, to the south-east, has an area of 420 square miles, and extends from east to south-west forty-eight miles, having an average breadth of ten. The waters are saline, and supplied by upwards of thirty streams, the principal of which is the Szala. The depth does not exceed forty feet, and is in some parts very shallow; the banks are marshy, and the surplus waters are carried by canals to the Sio and Sarviz rivers, to the south. This lake is 918 feet above the sea.

The Sarviz is the only affluent of the right bank of the Danube during its south course, until it receives the waters of the Drave, when its course is again turned to the east by the Julian Alps, which direction it retains until, shortly before its junction with the Black Sea, it trends to the north, confined by the Balkan and its northern spurs.

The Drave is not only one of the largest, but, geographically, one of the most important affluents of the Danube: it has its principal source in the south slope of the Dreyhernspitz; and its upper valleys connect with those of the Inn, the Salza, and the Adige, thus opening paths to the Tyrol, Bavaria, and Italy. One principal source of this river is in the gorge of Tolbach, having an elevation of above 4000 feet; the other descends from the sides of the Dreyhernspitz, and flows with a rapid course for about sixty miles, in direct distance, when it receives the waters of the Moll, from the left; and about twenty-five lower down, those of the Gail, from the right, and between them the surplus waters of several lakes. The most important affluent is, however, the Muhr, from the left, which, rising in close proximity to the sources of the Salza and Enns, has a north-east course of about seventy-five miles, when it receives a small stream which flows from the north-west slope of the pass of the Semering, as the Leitha does from the north-east, the two valleys extending in the same direction nearly 100 miles; thence it flows to the south for forty-five more, and approaches within eight miles of the Drave, when, trending east, it has its course nearly parallel to that river, about fifty-five miles lower down; its entire course is estimated at 230 miles.

The course of the Drave may be estimated at about 400 miles, for three-fourths of which it is navigable; after the junction of the Muhr it flows through a level, marshy country, and receives no affluents of importance.

The Save has its rise near the pass of Tarvis, to the north of Mount Terglou, and the valleys of its head waters connect the interior with the coast of the Adriatic; its course is estimated at about 500 miles, and is navigable for vessels of above 100 tons to the influx of the Kulpa, a powerful affluent of the right bank; it also receives the waters of the Nuna, the Vurbas, the Bosna, and the Dwina, which drain the province of Bosnia. The Kulpa rises only twenty-nine miles north-east of Fimmel, and has a course of 120 miles; the Nuna and Vurbas have about the same length; the Bosna and Dwina about 180 miles; both have several affluents.

The only other river of importance on the right bank of the Danube, rising in the primary watershed, is the Morava, which is formed of two branches, flowing for about 130 miles, respectively, from the east and west: the latter receives the Ibar, an important affluent from the south, as well as several other streams: the former, which has also several feeders, has its main sources in the central pass of the Balkan, and opens to the grand defile of Trajan. After the junction of the two main branches, the Morava has a course of 115 miles before reaching the Danube; its basin is hilly, fertile, and well wooded.

The Danube, from the confluence of the Morava, has numerous affluents on the right; the more important are the Isker and Wid, the head waters of which are in immediate proximity to those of the Morava, Karasou, and Maritza, opening to the central passes of the Balkans; the Jantra, which flows from the slope of the Kezamlık pass; and the Jemurlu, the valley of which extends from Shumla to Silistria. The Isker has a course of about 150 miles; the Jantra of seventy-five.

4 *The Secondary Watersheds of the North.*—The western watershed of the Inn is formed by the mountains of the Vorarlberg, an extension of the Grisian Alps, as already noticed. From Mount Selvretta, the central knot of this district, these spurs diverge, one forming the watershed of the Inn, to the east, and the affluents of the Dwina, to the west; this was known by the name Alps of Algar; another, separating the Lanquart from the Ill, both sources of the Rhine; a third, which stretching north, forms the boundary between the main basins of the Rhine and the Danube. To the south, the valleys of the Inn and Upper Rhine are connected by two very difficult passes, those of Mount Julier, 8133, and Mount Albula, 7713 feet above the sea: the pass of Scira Plana also, 9710 feet in elevation, passes over the western spur, and unites the upper valleys of the Rhine.

The mountains of the Vorarlberg form a broad mass, ranging from 7870 to 9843 feet in elevation; and throwing off, right and left, considerable spurs between the head waters of the Rhine and Danube. The principal pass by which it is crossed is the Col d'Adelsberg, on the summit of Mount Arlberg, which rises 9200 feet in elevation. This pass connects the valleys of the Ill and the Inn, and debouches on the latter at Landeck, where the river, pressed upon by the spurs of the Arlberg, assumes an easterly direction.

From the north extremity of the Vorarlberg, the Alps of Constance enclose the Baden See, and extend to the Schwarzwald; this can hardly be considered an Alpine region; it is rather an elevated and rugged district, formed by hills varying from 3280 to 3937 feet in elevation, the summits of which are plateaux; they are crossed by several defiles, the principal of which are from the extremities of the lake. The Schwarzwald, or Black Forest, is more rugged, and rises in many places above 3500 feet; its culminating point is Feldberg, which attains 4765 feet in elevation. The mountains project from the principal line of elevation between the sources of the Rhine to the south and west. The Schwarzwald is covered with extensive forests, and abounds in minerals and metals. This, like the other chain to which reference has been made, diminishes in height towards the north; it has its longer slope into the valley of the Danube. The defiles are difficult; the most important unites the valley of the Sarine, an affluent of the Rhine, with that of the Donau; and this is met by another, from the valley of the Kinsig, at the junction of the three sources of the Donau. To the north of this the Schwarzwald forms the watershed between the smaller affluents of the Rhine and the Neckar; that of the Donau its affluents from the left, which is continued in the Rauhé Alp, or Alps of Suabia, for seventy miles, having an elevation of from 1640 to 3280 feet, and culminating in the Hohenberg, which attains an elevation of 3369. Like the watershed of the south-west already described, the summits of these mountains form plateaux from fifteen to twenty miles in breadth; unlike that, however, they have their longer slopes to the south, are more barren, and not dissimilar are the Steegerwald and Fichtelgebirge, the continuation of the Suabian Alps to the east, the elevation of which is not as great, scarcely attaining to 3000 feet, excepting at the culminating point, Ochsenkopft, on the south, rising above 3400 feet, between the sources of the Maine and the Naab, the Saale and the Eger; from whence the Frankwald extends north-west, the Erzgebirge north-east, and the Bohmerwald, forms the continuation of the valley of the Danube to the south-west. The line of the Steegerwald appears detached from those of the Rauhé Alp and Fichtelgebirge towards the north-west, separating the valleys of the Neckar and the Maine, and reaching those of the Wernitz and Altmühl.

The Bohmerwald extends for 150 miles, having its longer slope towards the Danube; it culminates in Heidelberg, near the source of the Regen, at 4616 feet. Savage in aspect, and covered with forests, the principal defiles of these mountains connect the valleys of the Eger, the Beraun, the Moldau, with those of the Naab, Regen, and the Danube; the latter river approaching within about ten miles of the sources of the Moldau, at Lintz; between the last two, for a distance of 100 miles, these mountains are only traversed by foot-paths; and the evils of a military government are apparent in the fact recorded by Lavallée, that the Austrians have broken up from twelve to fifteen miles of all the roads leading across them into Bavaria. From the defile near Lintz, the Mocherisches Gebirge, or Moravian Mountains, stretch for 150 miles more to the north-east; these are not dissimilar in character to the Bohmerwald; both have abundant deposits of iron and coal, as well as other useful metals and minerals, and the former were once noted for their mines of gold and silver. The Moravian mountains culminate at an elevation of 4285 feet. The principal defiles are those which connect the valleys of the Lischnitz and Kamp, affluents respectively of the Moldau and Danube, into which the latter, a small stream, flows between those of the Sizava and Iglava, affluents

of the Moldau and Morava, and between the March, or Morava, and main source of the Elbe.

To the north of the Morava, the mountains which surround Bohemia meet on the east in the knot of Sneeberg, as they do to the west in that of Oksenkopft. Sneeberg rises 4784 feet above the sea; from it the Sudetes extend to the south-east for about 100 miles, separating the basins of the Morava and Oder; they have been considered a prolongation of the Reisingebirge and mountains of northern Bohemia, have the same character, and attain an elevation of from 3280 to 3940 feet; the principal lines of communication across them are between the sources of the Morava, the Oppa, a feeder of the Oder, and those of the Vistula.

Another knot, known as the Jablunka mountains, unites the Sudetes to the Carpathians; the extension of this between the rivers Morava and Waag is indeed known as the western Kleine, or Little Carpathians; these extend, as has already been noted, till they nearly meet the spur of the Styrian Alps. The Carpathian mountains extend nearly 700 miles, and may be thus divided: the western Carpathians, from Mount Wisoky to Mount Krivan; the central, from thence to Mount Bisztra, enclosing the sources of the Theiss; and the eastern, from Mount Bisztricksora to the third defile of the Danube, surrounding the valley of the Maros; the culminating point of these is the peak of the great knot of Tatra, called Lomnitzerspitz, which rises 8779 feet above the sea level; Lavallee gives an elevation of 19,187 feet to the culminating point of the eastern Carpathians, and Mount Rуска has been estimated as 9900 feet in height. The western and eastern portions of this chain are more elevated and thickly massed than the central, by which comparatively easy access is obtained into the valleys of the Vistula and Dneister, which are separated by a spur from the main chain, projecting to the north-west. The principal passes are, on the west, one over the northern extremity of the Jablunka mountains connecting the valleys of the Waag, the Oder, and the Vistula, and one over the eastern spurs of Tatra connecting the valleys of the Donaiee and Hernad, affluents of the Vistula and Theiss: in the centre, one between the valleys of the Wisoka and Brodrog, affluents of the same rivers; another, connecting the Ungh, an affluent of the Brodrog, with the Dniester, and the Saan a considerable affluent of the Vistula: and on the east the Borgo, by which access is obtained from the main sources of the Theiss, called the Samos, to those of the Moldava and Bistritz, tributaries of the Sereth; on the south, the most important pass is that of the Rotherthurmer, over which there is an excellent road by the valley of the Aluta; the main watershed lying to the north and west, between the feeders of the Maros and Temes and the Aluta; and besides these, the Gimes pass opens into the country south of the Sereth; the Thorzburg unites the upper valley of the Aluta with those of the Alonitz and Jalonitza; that of the Tergova opens on the defile of the Lower Danube; while the Volkan unites the valleys of the Maros and Schil; these latter, however, rather appertain to the spurs than to the main chain of the Carpathians.

These mountains, called also Krapacs, surround the basins of the north-west affluents of the Danube, forming three sides of a quadrangle, the greatest length of which is from north-west to south-east, and throwing out spurs between their feeders; of these, the Kleine Krapacs on the west, and the mountains of Konigsberg, between the Waag and the Graan, are thrown off to the south and west from Tatra; on the east, two massy but magnificent spurs nearly surround the sources of the Theiss. Detached groups are also observable, as that of Medves, culminating on Mount Matra, which attains an elevation of 3300 feet between the valleys of the Theiss and Graan. Although not as elevated as the mountains of the primary watershed, these are distinguished for the grandeur of their outlines and sublimity of their scenery; their basis is of igneous rocks, principally granite, interspersed with gneiss, hornblende, and a variety of volcanic substances; they have mines of the precious metals,



of copper, lead, mercury, and rock-salt; their sides are clothed with fruits, and the valleys produce abundant crops of grain; the vine also flourishes on their southern slopes.

5 *The Secondary Affluents.*—Assuming the Inn to be the principal source of the Danube, the Donau may be considered as next in importance; its main source is the Berge, which rises in the Schwartzwald, at an elevation of 2850 feet; with this, two small streams, the Brigach and one which rises from the castle-yard of Donaueschingen, unite in a large marsh below that place, and from thence flow through a narrow and abrupt defile, the slopes of which are thickly wooded, in a north-easterly direction. The affluents from the right are the Ablach, by which entry is first gained into its valley; the Ostracht, noted for its swampy and impracticable banks, situated among hills and marshes; the Keiss, also marshy; these are comparatively but small streams.

The Iller, however, is a river of some importance, which, falling from the northern slopes of the Vorarlberg, flows through a wild valley for about forty miles, and then through a level country, and after forming many channels and numerous islands, and receiving several small affluents from the left, falls into the Danube at nearly a right angle to its course; its entire length is estimated at eighty-five miles. The Gunz, Mindel, Sazam, and Schmutter are streams flowing parallel to the course of the Iller, and falling into the Danube between it and the Lech. At the junction of the Iller with the Danube, that river is 1400 feet above the sea, and 108 feet in width. The Lech has its main source in the Arlsberg, and flows through a very wild and narrow valley for about forty miles in direct distance, with a north-easterly course, and from thence trends north through a wooded and mountainous country, which gradually opens on the left to a low and extensive plain, while its bed is overhung by a steep escarpment on the right; its course is estimated at 140 miles, in the last fifty of which the river changes its character, divides in anabanches, forms numerous islands, and expands to a mile and a-quarter in width. Here it receives the Westact from the left, which, falling from the northern extremity of the spur which divides the Iller from the Lech, has a course of eighty miles, and receives two affluents from the south-east. The Lech is also, in its lower course, skirted by the Schmutter and Oder; it is not navigable, and being in its upper course a torrent, its lower is subject to violent floods.

The Paar, Ilm, Abens, and Gross-laben are streams of from thirty to fifty miles in length, which fall into the Danube from the hills which extend round the valley of the Isar. The country through which they flow is low and marshy, and of rectangular shape, and the hills which form them project towards the spurs of the Bohmerwald which surround the valley of the Regen. The plateau of Rohr extends between the Abens and Gross-laben to the Danube, and presents its steep escarpment to the north-west; it is to be considered as a prolongation of that which forms the east bank of the Iller, in its middle course.

The Isar, rising in the north face of Mount Solstein, has its upper course through a wild and deep defile among impracticable mountains; its middle course is through a mountainous, but more open and well-wooded country, here it widens and becomes studded with islands, and receives several affluents, one especially of importance from the left; lower down it has a more easterly trending, and receives the Ammer, which has a course of seventy-five miles, from the left. The lower course of the Isar is through a marshy valley, and it forms numerous islands by its anabanches; the country on the left is low, but on the right the river is commanded by heights. Most of the affluents of the Isar spread into lakes, the principal of which, the Ammer, is ten miles long by four broad. Between the Isar and the Inn, the Fils, a river of little importance, has a course of seventy miles. Of the affluents of the left bank of the Donau, the first eight are merely torrents; of these, the Egge joins the main stream nearly opposite the confluence of the Iller. The Wernitz, a small stream, descends from the heights of Schillenberg.

The Altmühl is the first of importance; it flows from the slopes of the

Steigirwald, in a south-easterly direction, for about half its course, and then trends eastward, nearly parallel to the Danube. In the first part of its course it is a torrent, and flows through a rugged valley; in the second, like most of the affluents of the Danube, it flows through marshy and low lands. Its total length is estimated at 125 miles, and it falls into the Danube nearly opposite to the defiles of Abach.

The Naab rises from three sources in the Fichtelgebirge and Bohmerwald; it has a course of seventy miles, through stony valleys, is navigable, and receives the Fils, or Vils, from the right; it joins the main stream close to the mouth of the Regen, and nearly opposite that of the Inn. The Regen has its rise in the Bohmerwald, and flows in a direction opposite to that of the main stream, through a very contracted basin, by which access is obtained into Bohemia; suddenly turning to the south, it falls into the Danube after a course of eighty miles. The Ills, a torrent flowing from the Bohmerwald, is the only affluent of the left bank remaining to the upper basin of the Danube.

From the confluence of the Isar the Donau becomes navigable, and is about 328 feet in width; above, it flows through a continuous defile; below, an extensive and fertile plain opens on the right bank; here it widens, is covered with well-wooded islands, but still pressed by mountains on the left bank. lower down its course becomes very sinuous, and the elevations appear alternately on either bank; this character is maintained to the defiles of Abach; from hence to the defile which closes the upper basin of the Danube, after its confluence with the Inn, the rugged slopes of the Bohmerwald close upon its left bank, while the plains already described about the lower course of the Isar open widely on the right.

After the confluence of the Inn and the Donau, the united stream soon expands and divides between islands, acquiring a breadth of 2625 feet; subsequently it contracts to 656, and again expands to 1213 feet; here it is rapid, and navigation dangerous, and its banks are subject to serious inundations; here also the valley expands, and the river forms anabranches, encircling large islands, as already noticed.

Eight torrents, of from fifteen to twenty-five miles in breadth, descend from the mountains of Bohemia to the main stream. The first important affluent of the left bank is the Kamp, which flows through a deep and well-wooded valley; its upper course is winding, its middle parallel to that of the main stream, and its lower at right angles to it. This stream falls into the Danube opposite the mouth of the Trazen, and its length is estimated at seventy-five miles.

The Gœllerbach, though it has only a course of twenty-five miles, is important, as its valley opens communication with the eastern part of Moravia.

The March or Morava, has its principal source in the Sneeberg, from whence it flows to the south and east; till, pressed by the spurs of the Jablunka mountains, its course is turned to the south and west; but bending round their extremity, it gradually resumes its original direction, and falls into the Danube, just above the defile formed by the approach of the Styrian Alps to that chain. The upper valley of the Morava is rugged and mountainous, and it receives accessions to its waters from many torrents and small streams in its middle course; it receives from the right the Thaya, its principal affluent. This river is formed by two streams, which rise in the east slopes of the Moravian mountains; its valley, at first narrow and precipitous, gradually extends, and is interspersed with marshes and woodlands, through which the river finds its way by numerous channels; in its middle course it receives the united waters of the Iglava and Schwarza, of which the Zwittera and Littawa are also affluents, the former having a course of fifty-five miles, rising among the hills to the north, the latter a small stream flowing through lakes and swamps from the east. The Iglava is a large and important stream, opening communication with Bohemia, and has a course of about 100 miles. The estimated length of the Schwarza is eighty, of the Thaya 130. The Morava also receives

from the right the little stream, Russbach, which falling from the heights of Wagram, traverses the March field. The lower course of the Morava is through extensive marshes, interspersed with well-wooded undulations, and before entering the Danube it divides into numerous branches and channels.

The Waag descends from the mountain knot, Tatra, and confined between the long spurs of the Carpathians, the Jablunka, and Konigsberg mountains, its middle as well as its upper course is very tortuous and rapid, and has no affluents except mountain torrents; it joins, or perhaps rather is joined by, the Neuhaescl, the anastomosing branch of the Danube which forms the island Grosse Schutt; in its lower course it is subject to violent inundations, and its entire length is estimated at 200 miles.

The Neuhaescl also receives, near its junction with the Danube, the Neutra, which flows through a plain, and has a course of about eighty miles.

The Graan has its rise in the south slopes of Mount Dumbier, which rises 6500 feet above the sea; it has a course of 125 miles, and receives one affluent from the left, which flows through the valley formed by Mount Schemnitz. The Ipolz or Eypel, rising in the Medves mountains, has a course of ninety-five miles, and is navigable for about thirty-five; it has several affluents; falling from the south slopes of Mount Schemnitz, it unites with the main stream just above the defile formed by the approach of the spurs of the Carpathians to the Bakonywald.

Throughout the whole of its southern course the Danube has no affluent of the left bank worthy of notice; the Theiss, flowing nearly parallel to it for above 150 miles in a direct line, at an average distance of forty-five, though the courses of both are very sinuous. This river and its affluents drain the entire basin formed by the central and eastern Carpathians. In its course from north to south, the Danube flows in a broad channel, sending out anabranches, and forming numerous islands; here its extreme elevation above the sea scarcely exceeds 300 feet, and its fall is only three inches in a mile; its depth may be estimated at twenty feet, and its breadth as averaging 6000; one island (Czepe) formed by it is above thirty miles in length.

The Theiss has its principal sources about the Borgo pass, in immediate proximity to those of its most important affluent, the Maros. In the high mountain valley formed by encircling spurs of the Carpathians, the waters of the Szamos, Bistritz, and other streams unite, and bent northward by the Buchgebirge, an extension of the Reuss mountains, issues on the plains in a north-west direction, where other affluents add their tributes to the stream, and about forty-five miles in a direct line from where it issues in the valley, it receives the waters of the Theiss from the right, the sources of which are in close proximity to those of the Sereth and Pruth: twenty miles lower down, turning at a sharp angle, it flows westward, and receives the waters of the Brodreg, an important affluent from the north, formed by the junction of the Ung and other streams, which fall from the south slopes of the central Carpathians, and give access to the corresponding valleys of the Vistula and Dniester. Trending south, the Theiss now receives the Hernad, from the north-west, which is formed by the junction of the Tareza and Sajo, the head waters of which have their rise in the knot of Tatra and the Konigsberg mountains, and are in proximity to those of the Waag and Graan on the west, as well as the Donac and its affluents, which unite with the Vistula to the north; this river has an estimated course of 120 miles; the upper portion of its stream is rapid, the lower sluggish, like all the affluents of the Theiss; in its lower course it separates into two parts, encircling an island thirty miles in length. The south watershed of this river is formed by the Medves mountains, from the south and east slopes of which several small streams fall into the Theiss; the most important of these is the Zagyra, the numerous sources of which encircle Mount Matra; after its junction, the main stream has no affluents from the right; on the left it has the Koros, formed by the junction of three streams of that name, having their rise in the western termination of the spurs of the Carpathians, which

enclose the upper valleys of the Szamos and Maros; it receives one affluent, the Err, from the right, which is connected towards the north-west with the Theiss by an anastomosing branch. The Koros may have a course of about 200 miles.

The Maros, or Marosch, has its rise in the south flank of the Carpathians, and its upper course is through an elevated plateau of above 100 miles in length from north-east to south-west; surrounded by their projecting spurs, its position is very remarkable; for while, after issuing from the plateau, it affords access to the valley of the Aluta, and so with the lower plain of the Danube, its lower course unites it with the Theiss, and the affluents of the right bank of the Danube above the defile formed by the approaching spurs of the Carpathian and Balkan mountains, which it may, therefore, be said to turn. The principal affluent of the Maros is the Kukel, in its middle course, which rises from two sources of that name in the mountains of Transylvania; this river unites with the Theiss by three principal branches, enclosing a triangle of fifty miles from apex to base, and thirty miles on the base line; it has a course of above 400 miles.

The length of the Theiss may be estimated at 600 miles, for two-thirds of which it is navigable, and for the greater portion for vessels of 300 tons' burden; after the junction of its principal streams, it flows sluggishly through extensive morasses.

The Danube has three other small affluents on the left, in this basin—the Bega, Temes, and Karasch; of these, the Temes is the larger, and flows through a considerable lake at Csakosah.

Through the tremendous gorge called the Iron Gate, the accumulated waters of the Danube rush with fearful rapidity into the plain encircled by the Balkans and Carpathians, to the south and north-west; here it encircles the island of Orsova, which commands the pass; and from hence its numerous branches spread and intersect the plain, in inextricable confusion, channels and islands often extending ten and twelve miles in width; it flows first to the south-east, and then takes an easterly course for above 200 miles; then, bending at right angles to the north, it receives the waters of the Pruth and Sereth, and then stretches out its many arms eastward to the Black Sea.

The affluents from the left are numerous; the principal in its easterly course are the Schyl, Aluta, and Dombritza; of these, the Aluta is the most important, opening the communication with Transylvania by the Rotherthurm pass. The Jalonitza falls into the main stream in its northern course; and its head waters afford communication with those of the Aluta, which latter cannot have a course of less than 200 miles; but of all the rivers falling from the Carpathians our knowledge is very unsatisfactory.

6 *The Sereth and Pruth.*—These rivers, turning the northern flank of the Carpathian mountains, and opening communications with the lower course of the Danube, from Poland and Russia, are distinct in character from its other secondary affluents. The Sereth has its sources in Mount Czorna, opposite those of the Szamos, and has a course of 250 miles, in a south-east direction; it receives the Bistritz, Sutschava, Moldava, and Tatros, as affluents from the right, and the Birlat from the left; the former have their sources in the eastern Carpathians, near those of the Theiss and Brodreg; and the latter from the lower eastern spur which divides the valley of the Sereth and Pruth. The Moldava gives its name to the district, and has a course of above 100 miles. The Pruth, like the Sereth, comes down from the eastern slope of Mount Czorna; it has a course of 360 miles, and receives numerous small affluents, which intersect the country between it and the Sereth; the largest of these is the Baglui, described as 'a long chain of muddy pools.'

From the junction of the Pruth, the course of the Danube is ill defined; it reaches the sea, however, by three principal mouths—those of the Kilia, Sulina, and St. George, the delta formed by them being above forty-five miles in length and breadth; this, with the country immediately surrounding, is frequently inundated. On the north, the drainage is received into large lakes

and morasses; on the south, however, a range of low hills occupies the angle formed by the Danube, and sheds its drainage to the south-east, principally into Lake Ragem, or Rassem, more properly an inlet of the sea, of irregular triangular shape, about thirty miles in extreme length, and twenty in breadth. The Danube is navigable as high as the confluence of the Iller, for vessels of 100 tons; and its mouths, of which the northern is the most considerable, were accessible to those of the greatest burden until neglected by the Russians. Now that they are in the possession of the English and French, they will doubtless be again rendered available for the purposes of commerce without delay. The entire course of the river may be estimated at above 1700 miles; in direct distance, 1000.

7 *The Valleys of the Danube.*—It has already been noticed that the primary and secondary watersheds, nearly meeting at three points, divide the course of the Danube into four parts.

The first, or upper basin, is a plateau of pentagonal form, 1640 feet above the sea, well wooded and fertile, extending 210 miles from north to south; and the same distance from east to west from the extreme limits of its watersheds. From the confluence of the Iller to that of the Inn, the direct distance is 135 miles, but by the course of the river a triangle would be formed on that base, having its apex at the mouth of the Regen, and distant from the mouth of the Iller eighty-five, and from that of the Inn sixty miles; and few portions of the surface of Europe have more historical importance than this, which has been the scene of contest between the northern and southern, the eastern and western powers, respectively, from the earliest times.

The second basin of the Danube, into which it enters by a formidable defile, surrounded on all sides by mountains, is extremely irregular in its features; it is fertile, and rich in mineral products. From the confluence of the Inn to that of the Morava, is 140 miles in direct distance; but on the line of the Inn the valley cannot be estimated at more than fifty miles in breadth; the direct distance between these points is forty-five miles; and this portion of the valley assumes the aspect of a series of defiles, from the bold spurs which are prolonged from the mountains of Styria to the bank of the river: on that of the Leitha and Morava it extends to 100 miles; and here is the most fertile, beautiful, and salubrious portion of its course. In this basin the southern boundary is composed of rugged mountains, giving it an Alpine character; the mean elevation may be 5000 feet.

The third basin comprises nearly half of the whole area drained by the Danube and its affluents; raised scarcely 400 feet above the sea, with marshes extending over above 9000 square miles; a large portion also being arid, sandy and barren; its climate is damp and cold; nevertheless, it is rich in flocks and herds, and the hills in minerals, corn, and wines. From the sources of the Brodreg on the north, to those of the Morava in the south, is in direct distance more than 350 miles, and from the pass of the Semering to that of Borgo about the same distance. The lower valley of the Theiss is more than 150 miles in extent from north to south, and above 100 from east to west.

The lower plain of the Danube, surrounded by deep and rugged mountains, is level, and in great part marshy; it is fertile in produce of every kind: here has been the entrance for the great waves of migration which, setting in from the steppes of the Caspian, have deluged central Europe, and the history of which may be read in the physical character of the basin of the Danube.

## CHAPTER XII.

### OF THE EAST AND NORTH OF EUROPE.

§ 1. The watersheds of north-east Europe.—2. The rivers of the south.—3. The rivers of the north.—4. The Scandinavian peninsula.

**T**HE *Watersheds of north-east Europe*.—The north-east of Europe consists of an extensive plain reaching from the Carpathians to the Oural mountains, and from the Baltic to the Black Sea; indeed, more properly it may be said to extend round the Baltic, and to be bounded on the south-east by the Caucasus, and on the north-west by the mountains of Scandinavia; it will in either case exceed one half the entire area of Europe, from the rest of which it is as distinct in character as in position, the outlets of its principal rivers being to the south-east, and the larger portion according with the north of Asia. The following dimensions are given by Lavallee:—from Akerman, at the mouth of the Dniester, to Cape Waigatch, 1988 miles; from Bromberg on the Vistula to Orokaia on the Oural, 1491; from Cape Apcheran to North Cape, 2112 miles; these distances, given in English miles, afford some idea of the extent of the country, but not of the peculiarity of its position; this is more clearly seen in the proportionately small extent of the base by which it is united to the rest of Europe, which from the mouth of the Teligoul, at the north-east angle of the Black Sea, to that of the Vistula, at the south-east angle of the Baltic, may be estimated at 650 geographical miles, while the longer boundary between it and Asia, from the northern extremity of the Caspian to the Gulf of Kara, does not probably exceed 1350. Situated between three seas, with navigable rivers flowing into each of them, having a coast line on the Caspian of about 500 miles in direct distance, on the Black Sea and Sea of Azov 350, and of nearly 1000 on the Baltic, the commercial and political importance of this country is very considerable; and if it were under influences which permitted the development of the talents and industry of its inhabitants, it must be the centre of commerce between north-west Europe and Asia, as the Danube is the natural outlet of central, and the Mediterranean of southern, Europe; this would be much facilitated by the inconsiderable elevation of the watersheds which separate its southern from its northern rivers. Originating in Mount Sloiczek, between the sources of the Dniester, Vistula, and Theiss, an irregular and broken spur extends to the north-east between the basins of the Vistula, Niemen, and Duna to the north, and the Dniester and Dnieper on the south, which gradually sinks into, and is lost in the plain, so that when their troughs are filled in the rainy season, the waters of these rivers become blended: between the sources of the Duna, or Niemen, and the Dnieper, it appears again in a plateau of small elevation, scarcely attaining 1000 feet in elevation, its culminating point being at Parcewitz, which is estimated at 1055 feet above the sea; this extends still north-east, and insensibly rising, joins the Oural mountains. A similar plateau, but of less elevation, extends south-east and north-west between the Dnieper and Dniester, which is connected with the Wihorlet mountains, a spur of the central Carpathians, but the distinct line of watershed is lost between the secondary sources of the Dnieper and Vistula.

The more elevated portion assuming dome-like shapes, and being covered with forests, is known as the Valdai hills; these are of argillaceous formation, based on granite; the plateau which connects them with the Oural rises to the east and north, in an irregular calcareous chain, which may be considered as an extension of the Oural mountains, towards which the plateau of Chemo-konski stretches eastward, and unites with them in a knot, from which the waters flow in every direction to the Icy Sea, the White Sea, the Black Sea, and the Caspian: from hence the Ourals, under the name Poya, extend to Cape Waigatch.

The Oural, or Ural, mountains run nearly north and south under the 60th

meridian of W. longitude; their northern extension must be sought in the island of Nova Zembla; and their southern, round the sources of the river of the same name, between Lake Aral and the Caspian; their average elevation may be 1000 feet, but they culminate in Konjakofskoi Kamen, under the 60th parallel of N. latitude, at an elevation of 5397; a little from the north of which a spur is thrown out to the north-east, separating the gulfs of Obi and Kara, while another extends north-west round the Petchora to the promontory of Kamen-nos; the former is, however, the more important, rising above 5000 feet, while the latter scarcely reaches 1000. The portion of the Ourals about their culminating peaks is covered with dense forests; to the south there is less wood, but the valleys are fertile and well watered. These mountains, composed of crystalline and slaty rocks, abound in minerals and metals; iron is worked in large quantities, and the yield of gold was until late years among the largest from any part of the world.

From the north-west, the range of heights which occupy the centre of Russia are met by the extended spurs of the Scandinavian mountains, which, while between the Icy Sea and the Baltic they attain an elevation of above 4500 feet, gradually subside towards the east to 700 and 300 feet; notwithstanding their identity is obvious, by the primitive rocks of which they are composed; they form the watershed between the Gulf of Bothnia and the White Sea, and spread over a country abounding in small lakes and morasses, interspersed with sandy steppes.

2 *The Rivers of the South.*—The Dniester has its principal sources in Mount Sloiczek; its main stream has a general south-east course; it receives numerous affluents both of the right and left, the former, falling from the slopes of the Carpathians, rapid; the latter sluggish, and forming chains of small lakes. Of the former, the principal is the Styry, by the valley of which communication is gained with the head waters of the Brodskog and the Theiss. In its middle course, approaching within about eighteen miles of the Pruth, the Dniester has no affluents of the right, until, in its lower course, it receives the Kobotta and other small streams; the country between its mouth and that of the Danube is occupied by the Kageluk or Koujalnik, having a course of about 100 miles, and falling from the southern extremity of the watershed between the Pruth and Dniester, which in their middle course is well defined. Of the affluents of the left, the most important are the Scred and Podhorce. The length of the Dniester in direct distance may be 400 miles; its windings may extend to 100 more; its navigation throughout is impeded, though from different causes; its upper course is over a shallow rocky bed, among well-wooded hills; its central through fertile valleys, abounding in corn, cattle, and timber; its lower through vast plains producing only pasture for cattle, interspersed with lakes and marshes: the climate in each varies with their character. The mouth of this river forms a deep elongated lagune, twenty miles in length by five in breadth, connected with the sea by two very narrow channels. The mouth of the Koujalnik also forms a lagune of similar character, and between them the Solenoe lagunes extend along the coast for twenty miles.

Beyond the Dniester, the Koujalnik, Telegoul, and other smaller streams, are lost in the morasses and lagunes which extend on the shores of the Black Sea, between that river and the Bug, or Boug. This is a large river, flowing parallel to the course of the Dniester, and having its origin in the southern slopes of the plateau which separates the basins of the Dniester and Dnieper. The principal affluents are the Kadima, or Kodyma, on the right, and the Siniouka on the left; the latter, with its branches, draining a considerable area. The Bug is 350 miles in length, and falls into an estuary, prolonged to the south, in the Gulf of Kherson, extending about twenty-five miles in length, and being five in breadth at its mouth; into this estuary the Ingul also flows, which has a course of 150 miles, to the east of the Bug.

The Dnieper, notwithstanding its magnitude, must, with those already enumerated, be considered among the tertiary rivers of Europe, having its

source in the Valdai hills and the marshes to the south, in which the Bug, the secondary source of the Vistula, has also its rise; the same rule being observable in these as has already been noticed with respect to primary rivers.

The main sources of the Dnieper, surrounded by the well-wooded slopes of the Valdai hills, flow, deeply imbedded, through a fertile country, varied with numerous acclivities, and it maintains this character till it is joined by its secondary source, the Pripetz, from the west; it is above 300 feet in breadth about 100 miles from its source, where it becomes navigable; in its upper course it receives, among other affluents, the Drutz and Beresina from the right, and the Soj from the left; these, and especially the Beresina, which has its rise in the marshes of Dokchitsy, flow through a country of morasses and swampy forests; this is a broad, deep, and rapid river; has a course of 200 miles, and a considerable affluent, the Svislotch, from the right, on which bank the ground is more elevated. The Soj is a navigable river, with a course of 240 miles.

The Pripetz, the secondary source of the Dnieper, flows through the swamps of Prujain, and has its sources in immediate proximity to those of the Bug, as already noted, its principal streams, however, fall from the northern slope of the plateau; its main stream is formed by the junction of the Selucz and Goryn, which receives from the left the Styr, Przypec, and Jusiolda. The morasses in this valley may extend above 200 miles in length, from east to west, and 100 in breadth from north to south. The Dnieper receives no other affluents of importance from the right. The principal of those from the left, the Desna, the sources of which are in immediate proximity to those of the Don, and which may probably be the main stream of the Dnieper, is formed by the junction of two principal branches, and has a course of about 500 miles, through the greater portion of which it is navigable; after its junction with the Dnieper, that river takes a south-easterly direction for above 200 miles, in the course of which it receives the Soula, Korol, and Samala from the left; here it attains a breadth of 4593 feet, and turning south, it is precipitated in rapids for forty-five miles over a rocky bed, and becomes studded with islands; it then trends to the south-west, and its mouth is an extended estuary studded with islands, forming, in fact, what would, under other circumstances, be the delta of the river; here it receives on the right the Ingoulitz from the north; this is a considerable stream, having a course of above 200 miles. In direct length, the Dnieper is 623 miles; its windings increase that distance to more than double.

The river Don, encircled by the Oka and surrounding secondary sources of the Volga, notwithstanding it appears insignificant beside the greatest of European waters, is a river of much importance, and drains a large area; rising in the small lake Ivanow, it flows in a south-east course, as if to add its waters to the main stream of the Volga; but when within twenty-five miles of that river, it changes its course to the south-west, a granitic range extending from the Caucasus interposing, which also diverts the Volga itself from its southern course, and turns it towards the Caspian Sea. A considerable depression is indeed observable between this range and the main chain of the Caucasus, which is occupied by Lake Bolchoi Ilmen, the river Manich, which carries its surplus waters to the Don, and the Kóuma, which flows into the Caspian; but its geological character gives unmistakeable evidence that it must be considered as an extension of the primary watershed. The Don has a circuitous course of nearly 1000 miles, though the direct distance from its source to its mouth is less than one-half; it receives two affluents, the Sosna and the Donetz, the larger and most important, draining the fertile district of the Ukraine on the right; those on the left are more numerous, and include the Varonetz, Khopper, Medvietza, Sal, and Manich; to the latter reference has already been made; it has a course of about 300 miles, one-third of which is through lakes and marshes. The waters of the Don are strongly impregnated with chalk, and its bed is formed of chalk and mud; its upper course is through a hilly and fertile country; its left bank is, throughout its lower



course, frequently overflowed; shoals and islands are frequent in its channel, which is therefore only navigable in spring, when the waters are highest; it enters the Sea of Azov by several mouths, and its delta extends fifteen miles from the apex on a base of ten.

The slope of the Caucasus to the north presents a country of great beauty and fertility; the mountains broken by rich valleys abounding in corn, wine, and fruits, the former cultivated at an elevation of 8000 feet; and the plains at their base producing large herds of cattle; the Kouban and the Terek, however, are the only rivers of which it can boast. The Kouban is a rapid river, rising on the north-west defiles of Mount Elbruz, after receiving many small affluents, after a course of nearly 400 miles falls into the Black Sea to the south of the eastern peninsula, which separates it from the Sea of Azov; its effluence is in a lagoon, twenty miles long and ten broad; and two other lagoons, having together as considerable an area, occupy the mouth of the isthmus. The Terek is also a rapid river, with numerous affluents, having a course of above 300 miles. The Kouma to the north has a course of nearly equal length, but flowing through a lower country might connect the Sea of Azov with the Caspian by the course of the Manich.

The mountain range of the Caucasus has already been partially described; its summits are round or flattened, and culminating 18,000 feet above the sea, its eastern portion is always covered with snow, as far as  $40^{\circ} 30'$  west longitude; about the sources of the Kouban it sinks rapidly, terminating in rounded chalk hills to the west, and limestone cliffs toward the sea; it is composed chiefly of secondary rocks to the north, with volcanic rocks interspersed, though it contains no active volcanos. Minerals and metals, especially iron, copper, lead, and it is said coal, are plentiful. Of this region, however, we know less than of many much more distant and less valuable portions of the earth's surface.

Separated from the Caucasus by the Strait of Kertch, having an average width of seven miles, but much contracted by shoals and sand-banks, lying between the Sea of Azov and the Gulf of Perekop, a deep indentation of the north-west angle of the Black Sea, and attached to Europe by the narrow isthmus not exceeding six miles in breadth, from which the gulf takes its name, is the peninsula of the Crimea; of a quadrangular figure, extending from east to west 150 miles, and from north to south 100, it shows its affinity to the Caucasus in the mountain range which extends along its southern shore; this may have a linear extension of 100 miles, and be in breadth about seven, culminating near the centre in Tchatyr-dagh, 5050 feet above the sea; this does not rise in lofty peaks, but is flattened at the top, has a precipitate fall to the sea, and presents on the south side many small but beautiful and fertile valleys, assimilating in character, climate, and productions to those of Italy or Greece. The extension to the east forms a peninsula thirty miles in length, united to the larger mass by an isthmus about ten miles long and as many broad, between Kaffa Bay in the Black Sea, and that of the Arabat in the Sea of Azov; through this the chain of elevation is extended to the north-east angle. The north slope of the mountains is prolonged to Perekop, and presents at their base extensive sandy and, in summer, arid plains; these, however, are capable of producing abundance of grain, and now sustain numerous herds of cattle. Its streams, often dried up in summer, are unimportant, the largest, formed by the junction of the Salghyr and Karasu, may have a circuitous course of eighty miles.

From the Dnieper to the Don, and round the north extremity of the Sea of Azov, a dreary, monotonous plain extends for nearly 100,000 square miles, which at present supports only cattle, and a scanty nomad population; though there can be no doubt that it would amply reward the labours of the husbandman.

The Volga takes its rise in the Ural mountains, and is separated from the rivers of the north and from the Don by the plateaux of central Russia. The best known source of this river is, as usual, its secondary source, which has its

rise in the slopes of the Valdai hills, at an elevation of 800 feet above the Black Sea, and 875\* above the mouth of the river in the Caspian. The main source must, however, have an elevation considerably greater, as it has its rise in the central and highest portion of the Ural mountains, under the 60th parallel N. lat.; this, under the name Kama, receives numerous affluents, both from the right and left, and flowing through Permian, unites with the north-west streams in about 55° N. lat., under the 60th meridian W. long. Of the affluents of the Kama, the Valka, on the right, has a course of 500 miles; and the Bielava, on the left, rising from two sources, is of as great extent. The course of the Kama may be estimated at 1500 miles. One source of the north-west stream of the Volga is in Lake Selinger, in the Valdai hills, 550 feet above the sea. The western stream receives numerous affluents; the principal are, on the right, the Oka and Sowa; the former has a course of 650 miles, for the greater part of which it is navigable, through the most fertile part of Russia; it receives several affluents, one of which, the Moskowa, gave its name to the ancient capital of the country; the latter has a course of about 400 miles. On the left are, the Tertza, Molovga, and Sheksna; the former has a course of above 100 miles, and is in close proximity to Lake Ilmen; and by it communication is established between the Caspian and the Baltic; the second, which has a course of 250 miles, is also connected with the Ladoga; the latter flows from Lake Bielo, and communicates with Lake Ladoga and the Dwina. The Samara is the only affluent of importance which the Volga receives after the confluence of its two principal streams.

About the secondary sources of the Volga, the same facility for water communication is observable, which is remarkable, in north-east Asia and North America, and which is also found, though to a smaller extent, in Sweden and Norway; it is, in short, the distinguishing characteristic of the northern slope of the continents towards the Icy Sea; but is perhaps nowhere more strongly developed than in the basin of the Volga: that river is navigable for vessels of five feet draught of water from the confluence of the Samara to that of the Sheksna—which has its rise in Lake Biloe Ozero, about fifty miles south of Lake Onega, with which it communicates; it is twenty-five miles long by twenty broad, and of considerable depth—and below that point for vessels of considerable burden; but its course is impeded by sand-banks, and is very subject to changes: the Kama is navigable almost to the base of the Oural.

This great river, known also by the Greeks as the Rha, and by the Tartars as the Adel or Idel, is of importance as being the natural means of communication between the Caspian and Black Sea; its basin may be called Russia proper; the western portion of its upper valley is fertile; the eastern comparatively barren, but abounding in mineral wealth; its middle course, from the junction of the Samara, when it trends to the south and west, is through an open but desert country for 300 miles, when, suddenly turning to the south-east, it receives the Sarpa, which has a course of 200 miles, from the south, and continues, in that direction, its lower course through swamps and morasses; it is said to enter the Caspian by seventy mouths, and has throughout its lower course anastomosing branches; its delta may extend more than fifty miles, and has numerous islands beyond it. At the junction of the Oka, the Volga is 4600 feet in width, but lower down is narrowed between steep banks; at Kasan, not far from its confluence with the Kama, it is only 600, and about half-way down its middle course 1200; in the time of floods, above the delta, its waters extend fifteen miles; its entire course may be estimated at 2000 miles; its waters are frozen during five months of the year.

The Oural, falling from the south extension of the mountains of the same name, forms the nominal boundary between Europe and Asia; its course may be estimated at about 800 miles, for two-thirds of which it may be esteemed navigable; it has two principal affluents, the Ilek and the Sakmara,

\* If the Caspian be, as determined by the Russian Survey, 102 feet below the Black Sea, this estimate must be altered accordingly.

the latter having a course of above 300 miles. The upper valley of the Oural corresponds with that of the Bielaya—is mountainous, and abounds in minerals; its lower course, through sandy and marshy steppes, corresponding to those which extend to the east and south, towards the Lake Aral.

3 *The Rivers of the North.*—Returning to the secondary watershed of central Europe, the Vistula occupies a position in the north similar to that of the Dniester in the south, but is a much larger and more important river; it has two principal sources, one formed by the junction of the San with the Vistula, and the other by the junction of the Narew with the Bug. The former comes down from the north slopes of the Carpathians; the latter originates in the marshes on either side the central plateau, from which the Dnieper flows to the south-east, and the Niemen to the north-west. In its upper course the Vistula, called by the Germans Weitzel, receives the Pilica, a river of considerable size, from the left; the San, which receives several affluents, has a course of 250 miles; below the junction of these rivers the Wieprz, on the right, and the Baurz, on the left, are the most important affluents.

The Bug has its watershed in the spurs which extend from the Carpathians, round the sources of the Dniester; and here the Pultew, one of its affluents from the left, if not its principal source, has its rise; its course is north and north-west for above 300 miles; its principal affluents are the Mucharicc, which opens a communication with the west sources of the Dnieper; and the Narew, which some consider the main stream, but which has only a course of about 200 miles. Below the junction of the Bug and Vistula, the principal affluent is the Oukra. The Vistula falls into the Baltic by several mouths, through a country of morasses, intersected by canals, which are subject to great changes, the extreme western mouth having been formed in 1840. The entire course of the river is estimated at 530 miles, for the greater portion of which it is navigable.

The two eastern mouths of the Vistula open into the Frische Haff, a lagoon, or rather inlet of the sea, separated from the Baltic by a tongue of land thirty-eight miles in length by one in breadth, but communicating with it by a channel half-a-mile in width; its entire length may be estimated at fifty-seven miles, and its breadth at twelve miles: it is nowhere more than twelve feet deep; it receives, besides the waters of the Vistula, those of the Pregel and Passarge. The eastern and western mouths of the Vistula are twenty-five miles distant from each other; and the point from which they diverge about the same distance from a line joining them; the entire area must not, however, be considered as delta formation.

The Passarge and Pregel drain the district intermediate between the Vistula and Niemen; the former has its sources in the north slope of the watershed of the secondary affluents of the Narew; it is a small and unimportant river, flowing in its upper course through a deep, narrow, and well wooded ravine; the latter is formed by the confluent streams of the Angerap and Pissa. The Angerap drains the Maner-see and other lakes of eastern Prussia, as the Pisch, a small affluent of the Narew, does the Spirling-see and those which surround it; this latter lake is eleven miles in length. The principal affluents of the Pregel are the Dista on the right, and the Alle on the left; it has a course of 120 miles, and its basin is estimated at the same area as that of the Thames.

The Bobr, and other affluents of the Narew, on the right surround the sources of the Pregel and interlock with them and with those of the Niemen; this river has its origin in the marshes of Dolguinowski, having its principal sources overlapped by those of the Dniester; and the Sczara, one of its principal affluents on the left, affords communication with the Pripetz, the principal affluent of the Dniester. The Sczara flows through marshes, and its banks are well-wooded. After its junction, the main stream flows through a deep gorge formed by the northern extension of the hills through the southern defiles of which the Beresina flows to the Dnieper. At the junction of the Syieta, of which the Wilia is an affluent, the Niemen is 656 feet in breadth,

and below this point flows through a level marshy country, receiving several affluents; it is here also called the Memel; its course is north-west, and estimated at 400 miles, nearly throughout the whole of which it is navigable; it enters the Kuritsche Haff by several mouths, the principal of which are the Rass or Russ, and the Gilge; like those of the Vistula, these extend for twenty-five miles. The Kuritsche Haff extends for fifty-three miles along the coast, separated throughout its whole length by a narrow tongue of land about half a mile in width; its greatest breadth may be twenty miles and its depth twelve; the channel by which it communicates with the sea is 300 yards across. Between the Kuritsche and Frische Haffs a quadrangular tract of land, twenty miles in length and breadth, extends into the sea, rising towards the centre; surrounded by marshes, communicating both with the Pregel and the Kuritsche Haff, it may be almost considered as an island.

The Duna, also called the Southern Dwina, has its sources in the lakes of the Valdai plateau, near those of the Volga and Velikaja, on the north-east; it flows for more than one-third of its course to the south-west along the base of the plateau, then taking a north-west course it receives the Oula, then the Drissa from the right, also the Nilja and Desna from the left, besides others of less importance. Above the angle formed by its change of course, the breadth of the Duna is 394 feet, near its mouth above 2000, but it expands immediately to nearly 4000; it is shallow, and its streams impeded by ledges and rocks, but it is nevertheless navigable nearly throughout its entire course, which may be estimated at 450 miles.

Between the Duna and Memel, the land projects to the north round the Gulf of Livonia in breadth about seventy-five miles, through which the little river Windau flows into the sea. The district between the Gulf of Livonia and that of Finland, is principally occupied by Lake Peipus and the streams which flow into and out of it; this lake, called also Tschouds kœ Osuro, is about seventy-five miles long by thirty-five broad; it forms two basins: the southern, known as Lake Pskov, is estimated as twenty-three miles long by twelve broad, and receives the waters of the Velika from the south-east; this is broad and rapid, and has a course of 160 miles: the northern basin receives the Embach, Kosa, and other streams, and discharges its surplus waters by the Narva or Narowa; its banks are composed of morasses, swamps, forest, and sandy wastes; it is deep, navigable, and abounds in fish. The Narva has a course of forty miles, but is only navigable for a short distance. The district of Esthonia, lying between Lake Peipus and the sea, is low and marshy, the surface sandy, on a substratum of rock, which appears on the coast, and forms numerous islands; it is covered with pine forests.

The basin of the Neva, which extends into the Gulf of Finland, is very extensive; its waters all accumulate in Lake Ladoga; it includes Lake Ilmen on the south, Lake Onega on the north-west, and the lakes in the centre of Finland on the north-east; and drains an area of 400 miles from north to south, and 300 from east to west; it is bounded on the north by the granitic spurs already noticed, which reach from the Scandinavian mountains, through Finland, extend to the south-east between the rivers, falling into the Arctic Sea and the head waters of the Volga, and form the coast of the Gulfs of Bothnia and Finland; and on the south by the projecting plateaux of the Valdai. The lakes of Finland are extremely irregular in form, and are but little known, extending over a surface of above 100 miles square, divided by narrow strips of rocky land, and probably connected with each other; the most important of these is Lake Samia, which may be fifty miles in extreme length by thirty in breadth, but like the rest of irregular shape, and discharges its surplus waters by the Woxen into Lake Ladoga.

The central receptacle for the waters of this basin, Lake Ladoga, is the largest lake in Europe, being 124 miles long by 75 miles broad; its area is above 6000 square miles, and contains many islands; its shores are low, but nevertheless it is subject to terrific storms; its depth is very unequal; it receives about sixty rivers and streams, the principal of which are those flowing

from Lakes Onega and Ilmen. Lake Onega is 140 miles long by 35 broad, and has an estimated area of 3500 square miles; its shores are rocky and deeply indented; it has numerous islands and shoals, rendering navigation difficult, but is not liable to such violent storms as its sister lake; it receives the waters of ten rivers, the principal of which, the Vodsa, has its sources in several lakes, one of the same name to the north-east being thirty miles long by twelve broad; the river has a course of 120 miles; the Vytegra flows into it from the south, 450 feet above the sea. Lake Ilmen is thirty miles in length by twenty-five in breadth, and receives the Lovat, Msta Pola Chelon and several other rivers; the first connects with the Duna, and has a course of 175 miles; the second has a course of 250, and communicates with the Tvertza, an affluent of the Volga. The surplus waters of Lake Ilmen are carried by the Volkhov into Lake Ladoga; it flows with a rapid current in a direct north-east course for 130 miles; is deep and navigable, except when its stream is broken by rapids; but has no affluents.

The Neva is rather a strait than a river; its length being only forty miles, and its breadth 1500 feet, it appears too small a channel for the delivery of so large an area of water as the basin of Lake Ladoga and its tributaries, and it is therefore not remarkable that it should be subject to terrible inundations; it is fifty feet deep, receives several small rivers, which are partially navigable; its waters are frozen for six months in the year; it opens into the extremity of the Gulf of Finland, across which extends the island of Kronstadt.

From the north slope of the watershed of the basin of Lake Ladoga, several lakes discharge their waters into the Icy Sea, and the deep indenting arm of the Bieloe More, or White Sea: of the former, Lake Enara, having an area estimated at about 700 miles, has its outlet in the Patsjoki River; the Kola is the outlet of the smaller lakes, near which is Lake Imandra, which may be sixty miles in length from north to south; of the latter, the chain of lakes which extend to the south, under the names Kordo-zero, Piavo-zero, and Topo-zero, which is fifty miles long, by eight broad, and the others still larger; these unite at either end with the White Sea; also Lake Koutno, through which the river Kem flows to the sea; and Vygo-zero formed by the waters of the River Vzgl. The rivers which fall from the north slope of this watershed are the Onega, the Dwina, the Mezen, and the Petchora: the first a rapid river, broken by falls, rises in Lake Latcha, and has a course of 250 miles; the second, the northern Dwina, drains a considerable area, and is formed by the confluence of two streams, the Soukhona and Withegda; the former rises on the north-east slopes of the Valdai, near the sources of the Volga, and flows north-east for 150 miles, when it is met by the latter, which has as large a course in the opposite direction, through a low inundated and almost desert country; from this junction the direct course of the river may be 200 miles. As the Soukhona opens communication with the Neva and west sources of the Volga, so does the Withegda with the Kama and eastern sources of that river, and is also in close proximity with the sources of the Petchora. The Dwina is four miles wide twenty miles from the sea, which it enters by several mouths, is deep and rapid, but has only fourteen feet of water over the bar at the entrance; its principal affluent from the right is the Pineda, having a tortuous course of 300 miles; from the left the Vaga, in length about 250 miles; and in its lower course the Emtza.

The country encircled by the Petchora and Dwina is drained by the Mezen, which has a course of 400 miles, and the principal affluents of which are the Peya on the right, and the Vatchka on the left.

The Petchora drains the north-east slopes of the Poyas, which, as already noticed, form the connecting link between the Ourals, the easterly extending spurs of the Scandinavian mountains, and the Valdai Hills, by which they are again united to the Carpathians. The upper course of this river is very irregular and tortuous, and it receives many affluents; in its middle

course it turns to the north, and bending eastward in its lower course enters the Arctic Ocean by an extensive estuary studded with islands; its principal affluents are the Oussa on the right, and the Ijma, which has a course of nearly 200 miles, on the left.

The slope of this watershed to the Arctic Ocean is one vast inclined plain, an expanse of deserts, steppes, rocky wastes, forests, and morasses; here seed time and harvest are confined within a space of sixty days, and the inhabitants are almost dependent on the rein-deer for sustenance.

The west slope to the Gulf of Bothnia is similar in character to the northern, but less extensive; its rivers are small, and usually drain lakes and morasses, of irregular and uncertain shape; the most important of them is the Ulea, having a course of seventy-five miles, and draining the lake Uleatrask, thirty-five miles long by ten broad; the Kemijoki on the north drains a considerable, but almost constantly frozen area; the Kumo and others to the south are not important.

4 *The Scandinavian Peninsula.* The point of junction between the watershed of north-east Europe and that of the Scandinavian peninsula lies between the head-waters of the rivers Muonio or Tornea, which falls into the Gulf of Finland, and the Tana which falls into the Arctic Ocean, a spur, as already noticed, from the Scandinavian Mountains, which, culminating about 1800 feet above the sea, extends north and south more than 1242 miles. To the north the mountains are less elevated, but extend their numerous spurs west, north, and north-east, to the extremity of the continent, culminating about 3700 on the north coast, at the North Cape 1161, and on the eastern spurs at 3690 feet above the sea. The southern extension has a threefold division, the Koelen on the north, the Dovrefield in the centre, and the Langfield on the south; this preserves its integrity as far as the south-west extremity at Lindernaes, but a series of plateaux, known as the Seves Mountains, extend from it to the south-east, and form the framework of the more southern portion; the first culminates in Sulietelma, about 6000 feet;\* the second in Schnachettan, approaching 8000 feet; and the third in Skagesloestinden, above 8000 feet. This mountain range covers more than half the eastern peninsula, which may have an average breadth of 200 miles; it is formed by plateaux of small extent, varying from twenty-eight to thirty-five miles, and of from 1500 to 3250 feet in elevation, from which the mountain peaks rise, and between which the rivers and torrents descend through precipitous and rugged chasms to the sea; the mean elevation of the whole is not much above 2000 feet. The short slope of the mountain is presented to the west, the axis of the chain being about fifty miles from the ocean; the principal valleys are therefore on the south and east sides, none of them extend much above 200 miles. These mountains abound in lakes, which in some instances connect the waters on different sides of the peninsula. The coast is broken by deep indentations, called fiords. The snow line varies from about 1000 feet at the extreme north, to 5500 feet in Lat. 61°; about  $\frac{1}{3}$  portion of the surface is covered with perpetual snow, and on the south and in the centre vast glaciers descend into the valley, that of Folgefonden, in Lat. 60°, to within 5100 feet of the sea level. The climate of this peninsula is much more mild than that of the eastern part of Europe; the snow is on the ground from March to November, and the summer sufficiently warm to ripen grain, the cultivation of which extends to 70° N. Lat., in ten or twelve weeks. The varieties of the fir tribe, which cover a great portion of these mountains, reach, under the 60 parallel, 4000 feet elevation, and extend north with the arctic circle; the birch flourishes to the extreme north, and the oak is abundant in the southern districts. The similarity between this country and the opposite coast of the Atlantic in some respects has already been noted.

The rivers of the Scandinavian peninsula are scarcely more than torrents

\* The calculations vary thus, 5956, 6178, 6180, &c.

locked up in ice during the winter; some few, however, are worthy of notice: of these, on the south and east slope, are the Tornea, which has its western source within twenty miles of the fiords opening from the western coast into the North Sea, and flows through Lake Tornea, which may be twenty miles long by five broad, it falls into the head of the Gulf of Bothnia, and has a course of about 250 miles, in which is a remarkable cataract called Julhæ; the Sulea, formed by the confluence of two streams, draining chains of lakes, the southernmost of which occupy the slope of Sulietelma, and having a course of above 200 miles; the Pitea, also falling from the same mountains, of a similar character and nearly the same length; the Skelleftea or Skvenka, draining the Stor Afvan and Horn Afvan Lakes in a course of 150 miles: the Umea, formed by the confluence of the Windel and Umea, draining several lakes, among which the Stor Umea is twenty-five miles long by six broad, and having a course of nearly 200 miles; the Angerman, which has many affluent streams, and drains a considerable area; the Indals, which issues from a chain of lakes and pools extending north-west for 100 miles along the base of Silfiedlen, the principal of which is Lake Storsion, opposed to those lakes and streams which fall into the Gulf of Trondheim; and the Dal or Dala, arising from two principal sources, the eastern and western, flowing to the south-east through numerous lakes, and broken by cataracts, has a course of more than 250 miles; it is navigable at the mouth, which is widely expanded, and to the south of which small streams are collected in the lake or fiord of Maclar, a deep and irregular inlet of the sea, extending more than seventy miles from the Baltic, and ranging in breadth from five to twenty-five miles, and having at its mouth numerous islands.

The drainage of the south-east of the peninsula principally accumulates in Lakes Wetter and Wener. Lake Wetter, the smaller of the two, is in length about seventy-five miles and an average breadth of about ten; its height above the sea is 295 feet: it receives the waters of the Motala river, which again issue from it on the south-east, and find their way through a succession of lakes, of which the largest is Lake Roxen, to the Baltic. Lake Wener, of very irregular shape, may be estimated as about eighty miles in extreme length by forty-five in extreme breadth, and is divided into two basins by projections of the land from the north and south near the centre; the southern of these is known as Lake Dalbo; its area is estimated as containing above 2000 square miles, and it is 147 feet above the sea; it is not so deep as Lake Wetter, scarcely reaching 300 feet, while that has a depth of nearly 500 feet; its shores are deeply indented, and it receives more than thirty streams, of which the Klar or Klara, from the north, is the principal; this river has one source in Lake Fæmund, near the sources of the Dal; this lake is about thirty miles long by three broad. Lake Wener communicates with the Kattegat by the Gotha, a river navigable throughout its course of fifty miles, except at its effluence from the lake, where it is broken by the falls of Trolhætta.

Westward of the Klara and Lake Wener is the River Glommen, which falls from the angle at the projection of the two southern spurs of the Scandinavian chain, into that formed by the extension of the basin east and west in the straits of the Kattegat and Skaggerack which surround the peninsula of Denmark to the south. The Glommen is the largest river of Scandinavia, and rises in the plateau of the Dovrefield and slopes of Schneehettan, seventy miles south of Trondheim; its affluent, the Vermen, brings to it the surplus waters of Lake Miosen, which is fifty miles long by ten broad, and receives the Langen River from the north-west; this river has an irregular course, broken by numerous falls and rapids, of about 300 miles; its valley river is the most extensive in the peninsula, extending 215 miles in length, and known as the Osterdal; that of the Langen is the most fertile. The lower course of the Glommen is through several large lakes, and it surrounds, near its mouth, a considerable island.

The streams of the south-west are, in character as in position, intermediate between those of the east and west coasts of the peninsula; perhaps those most

worthy of mention are the Skem, the sources of which spring from glaciers and accumulate in mountain lakes, from one of which pours the Maan River, which at the Rinkanfos precipitates itself into a chasm 513 feet in depth. The Nid and the Torrisdals are of similar character.

On the east slopes of the peninsula there are no rivers, but their place is supplied by the deep inlets or fiords formed by the defiles of the mountains extending into the sea; of these the more important are Bukki fiord and Hardanger fiord to the south, the latter remarkable for the glacier of Folgefund, already noticed, and the Voring foss, a cataract nearly 900 feet in height, formed by one of the mountain streams which fall into its north-east extremity, about eighty miles in direct line from the sea. Drontheim fiord is the most important in the centre of the western coast. To the north they are very numerous. Tys fiord stretches towards the waters of the Tornea and Ulea, and Porsange fiord opens towards the extreme north. The coast is, in short, a labyrinth of waters, dividing rocky islands, inlets, and winding deep among the projecting rocky spurs of the mountains; of this, as of all the coasts, more particular notice will be taken when attention is directed to the oceans. The most important of the islands are the Lofoden, which project in a south-west direction from those which cover the coast to the north.

## CHAPTER XIII.

### SECONDARY WATERSHEDS AND RIVERS OF THE NORTH.

§ 1. The watersheds of northern Europe.—2. The secondary rivers.—3. The peninsula of Denmark.

**THE Watersheds of Northern Europe.**—These originate, as already noticed, in the two great mountain knots at the east and west of the Bohmerwald and the Carpathian mountains; on the west at Schneeberg the sources of the Morava, Oder, and Elbe, are in close proximity; on the east at Oksenkopft, the tributaries of the Elbe are as closely connected: extending from Schneeberg 125 miles east and north, between the sources of the Elbe and the Oder, the Riesengebirge confines the upper valley of the former river, at the entrance defile of which they are met by the Erzgebirge, stretching from the south-west for about 100 miles from Oksenkopft: the latter chain as it is the shorter is also lower, culminating at about 4000 feet, while Reisenkoppe, in the former, has an elevation estimated at about 5400, and is the highest mountain in Germany.

The depression between the Riesengebirge and Jablunka mountains opens communication between the main valleys of the Oder and Morava: the principal passes across that chain are between the sources of the Neiss and Bober, affluents of the Oder, and the Adler an affluent of the Elbe, and between the sources of the smaller affluents which join those rivers on the north and south of the defile from which the latter issues from its upper basin: these are all rough and wild, intersected by ravines, and the whole chain has a rugged and severe character; the gorgo which separates it from the Erzgebirge is formed by precipices 2597 feet high, therefore the latter may be properly considered as an extension of it, and the upper valley of the Elbe as surrounded by mountains and formed by the separation and reunion of the secondary chain of north Europe.

On the east the Thuringerwald is a continuation of the Frankenwald, which throws out spurs extending for 50 miles among the head waters of the Weser; the heights of this chain, covered with forests, are grouped and massed with little regularity, and separated from each other by narrow valleys; it is connected to the west with the watershed of the lower basin of the Rhine by the Rhonegebirge, which separates the sources of the Weser and the Mayn; it is rugged and sterile, culminating at about 3000 feet. The Vogelbirge extends the watershed further west for about thirty miles; from this, four



spurs have their origin—the Eggegebirge, which, culminating between the sources of the Lenne at about 2300 feet, is lost to the north-west in gentle undulations, which separate the Ems and Weser; the Westerwald, between the Sieg and the Lahn, composed of plateaux, which nowhere reach 3000 feet in elevation; the Taussengebirge, between the Lahn and the Mayn, of about the same elevation, but of more marked character, and appearing to be a continuation of the Hundsruok from the opposite side of the Rhine valley; and the Spesshardtswald on the south, which though it only attains about 2000 feet in elevation, is rugged in character, and appears to be extended between the valleys of the Neckar and Mayn in the Oderwald, and connected to the east and south, with the more prominent watershed, the Steiggerwald and Rauhé Alp, being almost detached, the communications with the valleys of this chain are rather between than across them.

The Thuringerwald has its north slope opposed to the south slopes of the Hartz mountains, a confused and irregular chain, covered with forests, abounding also in mineral wealth, extending for about 50 miles north-west and south-east; it culminates in the Brocken, at an elevation of 3658 feet above the sea; it is composed of grauwacke and clay-slate on a basis of granite; iron, copper, lead, and silver abound; these mountains separate the valleys of the Weser and Elbe; and from their northern slope originate the affluents of the lower basin of the former river. The Teutonenbergerwald may be considered as extending the axis of the Hartz mountains to the north-west, and separating the basins of the north from those of western Europe; by some writers these are considered as extensions of, or outliers from, the Thuringerwald, the Eggegebirge, and western spurs of the Vogelbirge, but the strongly marked lateral valleys of the Lippe and Unstruth, and the origination of the Ems and Aller in their northern and western valleys, seem to mark them as distinct; the rectangular connecting links are scarcely definable, but must be sought in the line of the head waters of those affluents of the Weser and Elbe by which direct and easy communication is obtained between their main valleys. The Teutonenbergerwald is of small elevation; from it, as well as from the Hartz, the watershed of the country is marked by low undulating hills extending to the dunes of the sea coast.

2 *The Secondary Rivers of Northern Europe.*—The Oder has to the Vistula and rivers of north-east Europe much the same relation that the Dniester has to the Dnieper and rivers of the south-east; it connects the wide, extended, low, and slightly developed plateaux, woods, plains, and morasses of the east, with the more highly developed and well-marked watersheds and valleys of the north and west.

The Oder has its principal sources in the slope of the Riesengebirge, confused and irregular spurs from which extend between the valleys of its affluents; the most marked is the Eulengebirge, between the Neiss and Bober; another also extends between the sources of the Oder and Vistula, but soon sinks in low hills which disappear among extensive plains, without any marked or distinct watershed. The valley of the Oder communicates with that of the Morava by three principal passes at its principal sources, its affluents on the left communicating with those of the Elbe, as already noticed; the upper course of this river is through extensive forests; the Neiss of Glatz may be its most considerable source, though it is usually considered an affluent of the left; it rises in the north-west slopes of Schneeberg, and is important for the mineral wealth of its valley, and has a rapid course of about 100 miles to its confluence. If the Neiss be not the principal source of the Oder, the Oppa must be considered so; it rises in the south-east slopes of the same great knot of mountains, and has a course of about sixty miles to its confluence with the Oder, which rises in the depression between the Riesengebirge, or rather its eastern extension, the Sudetengebirge, and the Jablunka mountains; this portion of the chain obtains the name Geisenker, on account of that depression being very apparent.

The other affluents of the left in the upper basin of the Oder are the

Westritz and Katzbach, those of the right are numerous but unimportant, the larger portion of the basin of the river on the east being occupied by its principal affluent the Wartha. Below the confluence of the Katzbach the character of the river changes, the lower basin being an extensive plain, and the river flowing between low and sandy banks, frequently anastomosing and changing its course, and forming marshes and lakes, and at its mouth extending in the Dammersche-zee, a sheet of water fifteen miles long by two broad, which again opens into the Stettiner-haff, a lagoon or inlet of the sea, similar in character to the Frische and Curitsche-haff already noticed; it is thirty-seven miles long by twenty-five broad, covers an area of 200 square miles, and has from twelve to eighteen feet depth of water; it communicates with the sea by three mouths, the Devinou, the Iwine, and the Peene, enclosing the two marshy islands, Wollen on the east, and Uzèdom on the left.

The principal affluents of the Oder, in its lower course, are on the left; the Bober, which receives the Quieiss, and other affluents, has a course of above 100 miles; the Neiss, of Gœrlitz, which has a course of about the same length, and affords communication on the west with the Spree; the Ucker, or Ocker, and the Peene, are small rivers, draining the marshy country south of the Spree and fall into the Stettiner-haff: the principal affluent of the right is the Wartha, which is indeed its secondary source, and nearly as large as the main stream; it rises in the heights between the Oder and Vistula, has a very circuitous course through a low marshy country, and has two important affluents—the Prosna, on the left, which has a course of above 100 miles; and the Netze, which, in its upper course, flows through a chain of marshy lakes, from south to north, and opens communication with the Braa, an affluent of the Vistula, which approaches within fifteen miles of it from the opposite direction; both streams then bend suddenly at right angles, and the Netze takes an easterly course to join the Wartha. This river has a winding course of above 200 miles, and receives a considerable affluent—the Kuddow—from the right, the course of which is parallel to that of the Braa. The Wartha, after the confluence of the Netze, forms many anabranches through marsh lands for twenty miles, which again unite and form a small lake at its confluence with the main stream.

The Oder has a course of nearly 500 miles, and is navigable to within its upper basin for barges of fifty tons' burden; the country between it and the Vistula, near the coast, is a sandy flat, intersected by small streams, which extend themselves into lakes over the marshy level surface: the climate is damp and cold, the soil sterile; but there are extensive pastures, and grain is partially cultivated. From the Stettiner to the Frische-haff the distance is about 150 miles. Not dissimilar in character is the country between the Oder and the Elbe, but it is more marshy, and the lakes and streams falling into the Baltic are larger; it is extended to the west in the island of Regen, separated from it by a channel averaging one mile in width, and containing 361 square miles, being in extreme length thirty, and in breadth twenty miles; here the coast becomes abrupt, and the shores of the island are very deeply and irregularly indented.

The sources of the Elbe are, as already noticed, in the Reisingebirge, near its culminating point, in opposition to those of the Oder and Morava; the principal rises from thirty springs; the most southern, the Elbe brunnen, is 4500 feet above the sea; the Moldau, however, has a greater length, before the confluence of their waters, and might be considered the main stream. The upper course of the Elbe is through a narrow and wild valley; its direction is first south, then west, and finally north-west; its first affluent from the left is the Adler, which flows from the south face of Schneeberg; in its western course there are few affluents, and those not important; but in its northern it receives the Moldau, which, descending from the culminating heights of the Bohmerwald, has its secondary source within about ten miles of the main stream of the Danube, nearly opposite the mouth of the Traun; it has, however, previously had a course of 735 miles, parallel to the moun-

tains, from north-west to south-east; but then, turning suddenly to the north, it continues that direction to its confluence with the Elbe. The Moldau is a deep and rapid stream, flowing through, and receiving its numerous affluents from, narrow valleys formed by spurs projecting from the Bohmerwald; of these, the Beraun, on the left, which drains the south-west of the upper valley of the Elbe, and opens communication with the Naab in its lower course, and with the Regen; the Woltawa, also on the left, and the Lorscheitz and Zasawa on the right, are alone important. Below the confluence of the Moldau, the Elbe receives the Eger, an important affluent, draining the southern slopes of the Erzgebirge, from the left; it descends from the south-east of the Ochsenkopf, and its sources are in immediate proximity to those of the Saal, the Mayn, and the Naab. The Eger has a course of above 100 miles, and has several small affluents. The only affluent of the Elbe, in its upper course from the right, is the Iser, which falls from the Reisingebirge, and flows through a very wild valley, from north to south, for about sixty miles.

The basin of the Upper Elbe is of quadrangular shape, extending 100 miles from north-west to south-east, and rather more in the opposite direction; it forms an enclosed plateau, intersected by spurs from the surrounding mountain chains, forming narrow valleys; it is well wooded, fertile in parts only, but rich in minerals; the climate is cold, the mountains being covered with snow during the greater part of the year, but the vine is occasionally cultivated; the main elevation is nearly 1000 feet; the Elbe issues from it, through the narrow and deep gorge of Spandau, as already noted.

On leaving its upper basin, the Elbe flows nearly north-west for eighty miles, in direct distance, to the confluence of the Elster; in its middle course, the affluents of the right and left banks have very different characteristics; those on the right, as has already been seen, flow through low, marshy lands, and have communication with the affluents of the Oder; while those on the left descend from the Harzgebirge, and the watersheds of the upper course of the Weser; on the right, the principal is the Schwartz Elster, which has a considerable affluent, the Rodir, from the left; those of the left are the Mulda, which flows from the north slope of the Erzgebirge for 125 miles, nearly parallel to the main stream, through a valley rich in minerals, receiving considerable affluent streams; the Saal, which has its rise in the Ochsenkopf, and flows through a deep valley, to the confluence of the Unstruth, a considerable affluent, having from the left a course of above 100 miles, and receiving affluents from the Harz and from the Thuringerwald, the most important of which is the Gera, from the left; the most important affluent of the Saal on the left is, however, the Elster, which, rising in the Erzgebirge, receives the Pleiss, a marshy stream, from the right, flows through a level valley, forming many anabranches, and has a course of above 100 miles.

The lower course of the Elbe is through a level marshy country, on the right full of lakes and marshes; on the left, approaching within fifty miles of the Weser, having a better defined watershed; the affluents of the left are small; the Obre, the Ilmenau, and the Oste, falling into the estuary of the main stream, may be noted; the Havel, which rising in the small lake Käbelich, has a course of 175 miles through lakes and marshes. The course of the Elbe to the confluence of the Spree is from north to south, thence from east to west; the Spree, its principal affluent, if it be not the more important stream, as its superior length and elevation of source would suggest, descends from the Reisingebirge, near the sources of the Schwartz Elster, receives several small affluents in its upper course, but in its lower frequently anastomosing, forms marshes, lakes and islands; its length must be above 200 miles. After this junction the united streams of the Havel and Spree receive the waters of the Nuthe from the left.

From the confluence of the Schwartz Elster to that of the Havel, the Elbe takes a serpentine course, from thence it flows north-west to the sea; here it receives the waters of the small rivers which drain the lakes of Mecklenburgh;

of these lakes the most important are the Muritz and Schwerin; the former is nineteen miles in length, and connected with many others; the latter fourteen, and its waters communicate both with the Elbe and the Baltic; in like manner Lake Ratzburg, the surplus waters of which are carried to the Baltic by the river Trave, is connected to the south with the Elbe. From the Elbe brunnen to Königstein, below the defile of Spandau the river may have a fall of 4000 feet, below that point not 500, and assuming the direct distance in the former to be 100 and in the latter 250 miles, the average fall would be in round numbers forty feet in the one, and six inches in the other, contrasting thus very decidedly the districts through which they flow.

From the defile of Spandau to the mouth of the Elbe is, in direct distance, 250 miles; the length of the river, including windings, is more than double; it is navigable from the confluence of the Moldau, but its bed is encumbered with sandbanks; its estuary, fourteen miles wide at the mouth, affords passage for vessels drawing fourteen feet of water to the mouth of the river; its stream throughout its lower course is sluggish, the greatest elevation of its bed not reaching 150 feet.

The Weser is formed by the confluence of the Fulda and the Werra, the latter is the principal source, and, rising in the northern slopes of the Frankensteinwald, flows north-west at the base of the Thuringerwald, has a serpentine course of 150 miles, through the greater part of which it is navigable, and receives several small affluents. The Fulda, which rises in the Vogelsberg, has also a tortuous course from the south-west of about 100 miles, for the greater part of which it is navigable; its principal affluent the Schawlen, from the left, rises in the Eggegebirge, and with its affluent, the Eder, also from the left, drains a considerable valley. The upper basin of the Weser is picturesque and, in the valleys, fertile, irregular in outline, and well wooded; it abounds in minerals, especially iron.

After the confluence of the two principal sources, the Weser receives from the left the Dimel, which flows through a district similar to that drained by the Fulda, it has no other affluent of importance on that side but the Hunte, which drains the southern slopes of the Teutoburgerwald and the marshes of Oldenburgh, flows through the Dummer lake, and after a course of about 100 miles, joins the estuary of the main stream: on the right the Aller, formed by the junction of the Leine and Ocker, is the only affluent, the basin of the Weser being in its lower course not more than seventy-five miles broad. The Leine has its sources in the northern slopes of the Hartz and the depression between those mountains and the Thuringerwald in close proximity to those of the Unstruth; and has its principal affluent the Innerste from the right, which rises in the north-west valleys of the Hartz, close to those of the Ocker. This river may have a direct course of 100 miles, for twenty-five of which it is navigable; it approaches within fifteen miles of the main stream of the Weser, where the interval is occupied by Lake Steinhuder, which is only five miles long by three broad, yet valuable for its fisheries.

The Ocker, if considered an affluent of the Aller, may have a course of sixty miles, having its southern sources in the defiles of the Brocken, and its eastern in the plains, through which flow the smaller affluents of the Elbe from the left. The Aller, flowing through the same marshy district, has a course of about forty miles, and from the confluence to that of the Leine is about thirty miles, in direct distance; from thence to the confluence with the Weser, twenty.

The Weser has a course of about 300 miles, and is navigable nearly to its source for boats, but only for a short distance for vessels of any burden; those drawing fourteen feet water may enter its estuary, which is twenty-four miles wide at the mouth.

3 *The Peninsula of Denmark.* To the north of the Elbe, in its lower course, is the district of Holstein, made insular by the Eyder and Trave; the former connecting the North Sea with the Baltic, the latter the Baltic

with the Elbe, as already noticed. The Eyder flows in a narrow serpentine stream across the isthmus, which is here forty miles in width from Keil Bay to the mouth of the river; the sources of the river being not more than seven miles distant from the bay. This district, which may be seventy-five miles in length by fifty in breadth, is studded with numerous small lakes, and affords abundant pasture for cattle; beyond it projects to the north-west the Peninsula of Denmark, which, with the islands appertaining to it, must be considered as the prolongation of the watershed between the rivers Elbe and Oder; it may be in extreme length 200 miles, and in breadth 90 miles, the highest point, which is near the intersection of these lines, does not much exceed 500 feet. The southern portion, called Schleswig, is narrow, in one part not exceeding thirty miles; but here the large islands of Funen and Zealand stretch towards the south point of Sweden, while the promontory and island of Fehmern extends from the north-east angle of Holstein towards Laaland, Falster, and Moen, which complete the group. The northern portion, Jutland, is of most irregular shape, indeed nearly divided by an arm of the sea, Lüim Fiord, which extends its ramifications in every direction, forms large lakes and surrounds islands, one of which is twenty miles long and ten broad, and having its mouth in the Kattegat, is only separated at its extremity from the North Sea by a narrow strip of sand, through which the sea sometimes forces its way. The coast of Denmark is indented by other fiords, those on the east stretching deep into the land; those on the west forming lagunes: the soil is fertile, abounds in pasture, and the eastern portions are wooded: the climate is moist and cold, yet milder than the parts of Germany to the south. The islands do not differ essentially from the Peninsula; Zealand, the largest of the Danish islands, is about seventy miles in extreme length, and fifty in breadth, but from its very irregular shape does not contain more than 6700 square miles of surface; Funen may be thirty-five by thirty; its area not much exceeding 1100 square miles, yet it has a river, the Oden-zee, thirty-five miles in length; the three smaller islands extend north-east, and south-west, and south-east and north-west, in either direction about forty-five miles.

## CHAPTER XIV.

### THE RHINE VALLEY AND ITS RIVERS.

§ 1. The watersheds of western Europe.—2. The Rhine and its sources.—3. The secondary watersheds of the west.—4. The Aar.—5. The affluents of the Rhine.—6. Rivers of the valley of the Lower Rhine.

**THE Watersheds of Western Europe.**—The watersheds of the west, from their proximity to, and parallelism with, the primary watershed of Europe, are more easily described than those of the north-west; if a circular direction be assumed for the one, then the other will have the same direction with a greater radius; or if, more accurately, a linear extension be taken, then the secondary chains of the north-west will appear parallel to the primary, having their extension in the secondary and tertiary systems of the north, as already described, and their transverse axes also parallel; thus the mountains of Greece to the south, and of the Bohmerwald, Thuringerwald, and their northern extensions, will be at right angles to the principal axes of both the primary and secondary systems; but the secondary mountains of the west will be parallel to the transverse axis of the main chain on that side of the continent, and nearly parallel to the other transverse axis: generally the slight convergence which is apparent is to the south and west.

The connexion of the watersheds of western Europe with those of the north-west and the islands, especially with Scandinavia and Great Britain, is not at first sight very apparent, but it becomes more so when considered in detail,

and especially when the geological structure is taken into account; and the same may be said of those of the south and west, where the great peninsular mass seems to have almost as intimate relation to Africa as to the rest of Europe. Indeed, one great characteristic of European orography, is the separation of its watersheds from those with which they appear naturally continuous, and this, as it has been seen exemplified in the description of its rivers, is not less remarkably so in those inland seas, the Black Sea, the Mediterranean, and the Baltic, between which so large a portion of the surface is included. The direction of the watersheds of the west of Europe seems to have been influenced materially by the upheaval of the transverse axis of the primary watershed which connects it with the secondary system to the south; and the two great rivers of the west, the Rhine and the Rhone, in their middle and lower courses cut off the watersheds of the west from those of central Europe; and thus while the superior watersheds are continuous, we find the inferior separated by the rivers, and their continuity only observable without reference to them; and this of necessity, otherwise the rivers would have no outlet, for these waters would change their characters, inundate their upper basins, and become lakes, not having any outlet, like so many in Asia.

It has been noticed that the Rhine has its sources in the great central watershed of Europe; and that while its more eastern are interlaced with those of the Danube in its middle course, and with those of the lower valley of the Po, the western are cut off from the southern and western spurs, which separate the valleys of the Po and the Rhone. The primary watershed of the Rhine has thus far already been described in its general features, and may therefore the more naturally be taken first.

2 *The Rhine and its Sources.*—The two principal sources of the Rhine are in Mounts Maloja and St. Gothard, the Upper and Lower Rhine respectively, the Hinter and Vorder Rhein of the Germans; while the Glenner, which has been called its middle source, a term also applied to one source of the Lower Rhine, has its rise in the northern slopes of the Splugen; these names are, however, very indefinite; the whole of the valley of the main stream of the Rhine might with more propriety be termed the Upper, and that of the Aar, and the lake districts, the Lower: the former has its rise in the Rheinwald glacier, in the north-west of Mount Septimer; the latter from the gorge of the Ober Alp, at an elevation variously estimated, but which may be assumed as about 8000 feet. With the Lower Rhine, the Glenner, which has its rise in the little lake Toma, unites; it has a longer course than the Upper Rhine, of nearly thirty miles to their confluence, from whence the united streams flow in a northerly course for above forty miles to the Boden-zee. The higher Rhine flows through the terrible defile called the Via Mala. The middle Rhine traverses a rugged valley surrounded by glaciers. The junction of the stream forms also the point of communication between the passes over the Splugen and St. Gothard, and at about ten miles beyond this point the elevation above the sea is not 2000 feet, so rapid is the declivity; from hence it is partially navigable to the lake. Pressed closely by a wall of rocks on the left, the river receives no affluents from that direction; but on the right, numerous streams flow into it from defiles opening at right angles to its course.

The Boden-zee, called also the Lake of Constance, is about forty miles in extreme length by ten in breadth; it is 1250 feet above the sea, and has a depth of near 1000 feet; the shores are for the most part flat, but at its western extremity a promontory extends to the south-east, separating the long narrow extension of the lake to the north from a small lake connected with the main water by a narrow strait, through which the Rhine flows. These are respectively Überlingen and Nuter-zee, or Lakes of Überlingen and Zell; the latter is ten miles long by four broad, and contains the island Reichenau. The Boden-zee has its length from north-west to south-east. The Rhine issues from Lake Zell in a westerly direction, and here a spur from the Alps, which forms the limit of its upper basin to the south and separates it

from its affluent, the Thur, projects toward the Schwartzwald, and over the terrace thus formed the river precipitates itself 100 feet, in the falls of Schaffhausen, which may be considered the limit of its upper basin; here turned southward, it receives the Thur, which has a course of seventy miles, and of which the Sitter, which flows from the See Alp, is an affluent; the Soss, or Soess, and the Glatt, which flows from the Griffen-zee; and again trending westward, the principal affluent of its upper basin, the Aar. These flow through precipitous and well wooded defiles nearly parallel to the main stream, from the northern slopes of the basin of the Aar, and form links of connexion with its second basin, or what might more properly be called the basin of its secondary sources, which is occupied by the river Aar and its tributaries, and extends 150 miles from east to west, and sixty from north to south; its western watershed is formed by the extension of the primary watershed to the north-west, by the secondary watershed trending north-east, and by the heights which connect them. This watershed must therefore be noticed before entering on the consideration of the course of the river.

3 *The Secondary Watersheds of the West.*—It has already been noticed that from the knot of St. Gothard two lofty and massive spurs extend to the north-west and south-west; the latter containing the highest summit of the Alps, and separating the sources of the Rhone and the Po; the former containing peaks scarcely less elevated, and separating the main sources of the Rhone from those of the Aar. The elevations to the south exceed 15,000 feet, in Mount Blanc and Mount Rosa; those to the north exceed 14,000, in Mount Furca and the Finster Aar horn. Perhaps a more general and comprehensive idea of the western extremity of the primary watershed of Europe may be obtained by considering the line of waterparting from Mount St. Gothard to Mount Rosa, having its centre in Monte Leoni, and the passes of St. Gothard and Simplon separating it on either side from the northern and southern masses, as a base, extending north-east and south-west for about forty-five miles, from the ends of which lines are projected, parallel to each other, of twenty and forty miles respectively, north and south; so that, from the extremity of the north, a line will fall perpendicularly on the angle formed by that on the south. Thus, the Finster Aar horn will be from Mount Rosa thirty-five miles, from St. Gothard twenty, from Mount Blanc sixty-five, while the latter mountain will be forty from Mount Rosa and eighty from Mount St. Gothard; the intersection of the diagonals will be in the upper valley of the Rhone, near the junction of its two sources, and they will be respectively in the direction of the valleys of those streams. The northern of the western prolongations of the great central mass of the Alps, although not the most considerable either in elevation or extent, is that along which the main line of waterparting is found. These mountains are called the Swiss or Bernese Alps; and form in one respect the first, at any rate the second, glacier system of Europe; for if inferior in number to those of Mount Blanc, the glaciers of the Bernese Alps are of greater extent, the entire area being estimated at 190 miles, or double that of the glacier system of Mount Blanc; here have been enumerated twenty-five glaciers, seven on the northern, thirteen on the north-east, and five towards the south, averaging above one mile in width. The great Aletsch glacier, on the south, has an area of about thirty square miles.

The line of waterparting here is extremely irregular, but has a general direction nearly north-west, extending from the Finster Aar horn to the Jungfrau; the granite peaks of the former tower over the Valais, while the snowy cone of the latter crowns the bold defiles of the Lauterbrunnen. From this line, of which the Watcher horn is the centre, three separate glacier systems are apparent, in the order already named, those of the south, the Lotsch, Aletsch, and Vietsch, being united together in the great *névé* in the northern slopes of the Jungfrau, and surrounding the rugged peak of the Aletsch horn; while those of the north are divided from each other by a transverse line of rocky peaks extending northward from the Finster Aar horn, and culminating in

the Shreck horn and Wetter horn; those of the Grindelwald on the north-west, and of the Aar on the north-east, with those of Gaulti and Rosenlaui between them, extending in each direction about seven miles from the Finster Aar horn, as a centre. The passes through this region are few, elevated, and very difficult, traversed only by mules and active pedestrians. At the extreme north, near the head of Lake Lemman, the Col dent de Jaman, 4872 feet above the sea level, turns the flank of the chain, and gives access from the valley of the Lake to that of the Saanen; which latter also communicates with the upper valley of the Rhone, by the Col de Gittenhaus, where the river bends at right angles beneath the southern spurs of Mount Diableretz, which culminates 10,190 feet above the sea; and round and on the northern slopes of which the two sources of the Saanen have their rise—the Col de Gemmi, 7404 feet, connecting the valleys of the Rhone and Lake Thun; the Col de Grimsel, 8402; and the Col de Furca, 8714, connecting the upper sources of the Rhone with the valleys of the Lakes Brienz and Lucerne. From this northern division the head waters of the Aar have their origin, and from hence irregular spurs ramify in all directions, surrounding the Lake of the Forest Cantons, or Lucerne, and those of Zurich and Thun on the north-east and south-west; and separating these again from the larger valleys of Lakes Lemman and Neufchatel, on the west, and the Boden-zee on the north-east, besides numerous other lakes occupying inferior valleys: thus all, Lake Lemman alone excepted, add the tribute of their waters by the Aar to the Rhine. The continuation of the watershed from the Jungfrau trends more to the south; its western extremity is Mount Diableretz, as already noticed; and this is connected with the Jura, the great secondary watershed of western Europe, by the semi-circular chain of the Jorat (the French appellation for the entire range being here localized), which does not rise 4000 feet above the level of the sea; its northern slope extends in the fertile valleys which open on Lake Neufchatel; its southern and more rapid forms the northern cincture of Lake Lemman; to the north-west of which it unites with the main chain of the Jura, which extends for nearly 150 miles between the Rhine and the Rhone, from where the former trends north, after its confluence with the Aar, to where the latter turns at a sharp angle round its southern extremity.

This range of mountains, which culminates in its eastern heights, Mount Moleson being 6588 feet, Mount Reculet, 5643, Mount Tendre, 5538, and Mounts Doli, Chasseron, and Chasseral, all above 5000; extends north-east to south-west and south, in six parallel chains, enclosing lateral valleys, covering nearly forty miles in breadth; these diminish in elevation towards the west, the eastern having a mean height of above 3000 feet, while the western does not reach 2000, and sinks gradually in the plateaux which bound the valley of the Saone: on the south they bend towards the projecting spurs of the transverse chain of the Alps; on the north-east they are separated from the Schwartzwald by the Rhine gorge, but their principal extension is towards the north, where they form the Vosges mountains, and separate the Doubs from the Ill, affluents respectively of the Rhone and Rhine, and originate the secondary rivers which flow through the extended valleys of northern and western Europe.

The geological formation of the Jura is oolitic; its principal characteristics gypsum, marble, and alabaster, and in the south asphalt; it abounds in iron and mineral springs; its pastures are rich, and its woods luxuriant in their growth, extending over the summits of the mountains. The routes across the Jura open chiefly in Lakes Lemman and Neufchatel, and on the central courses of the Rhine, traversing the chain for the most part at right angles to its axis: the most northern lies between the northern angle of the Doubs and the sources of the Ill and Moselle: the central from the north and south of Lake Neufchatel to the waters of the Doubs; and by the source of the Ain, from Lake Lemman to the lower valley of the Doubs, this crosses five distinct ridges: the southern from Lake Lemman, to the valleys of the Ain and Rhone. The Jura and the Bernese Oberland, and the connecting chain of the Jorat, form the cincture of the basin of the Aar.



The connexion between the Vosges and the Jura appears in the Ballon d'Alsace. Here, at the Gap of B fort, is the communication between the Rhine and Rhone and the valleys of the west; and the gorge of Valdieu connects the basins of those rivers. The Vosges mountains extend from the Ballon d'Alsace to the confluence of the Moselle with the Rhine: the southern extremity culminates 4688, and Mount Guebwiller 4300 feet above the sea, and the centre, in Mount Donon, approaches 3500; to the north, about the sources of the Lauter, they are much less elevated, but rise again beyond that river in the Hardtwald; and between the Moselle and Nahr, in the Hockwald, both rising to near 2000 feet. This range terminates in the Handsruck, at the confluence of the Moselle with the Rhine, being above 150 miles in length and about forty in breadth; it consists of rounded summits, hence called ballons, above the general line of elevation, having no precipitous defiles, but valleys opening to those of the main rivers, and affording easy communication between them: the eastern slope is much shorter than the western; both are covered with forests, and abound in minerals and rock-salt.

The southern extremity of the Vosges is connected by Monts Faucilles, the Sickel Mountains, with the Plat of Langres, which extends to the north in the wooded heights of Argonne and the Ardennes, between the Maas and the Oise on the west, and the Moselle on the east; the latter stretching towards the rugged volcanic mass of the Eifelgebirge, which with the Teutoburgerwald and Hartz mountains, may be considered the tertiary ranges of north-west Europe; the western range of Argonne forms the most advanced terrace of the Vosges, and spreads its numerous undulations around the sources of the Oise and Scheldt, extending between the latter river and the Somme. On the south, from the Ballon d'Alsace, the Vosges are connected by the C te d'Or with the Cevennes; these, covered for the most part with forests, abound in limestone, marbles, gypsum, coal, iron, and are noted for the luxuriant growth of the vine. The Cevennes extend round the sources of the Loire and Garonne, trending south and west towards the Pyrenees; they culminate in Mounts Lozere and Mezen, which are respectively 5794 and 4884 feet above the sea, and from their centre the Forez chain, reaching to nearly 5000, extends between the Loire and its affluent the Allier, and is connected with the volcanic plateaux and domes of Auvergne, which, raised 2789 feet above the sea, is studded with extinct craters, of which the principal, more than forty in number, extend from north to south for eighteen miles; the culminating points are the magnificent cone of Mount d'Or, 6188 feet in elevation, Cantal 6093, and Puy de Dome 4806; the rugged sides of these mountains, formed of basalt and scor a, present scenes of most picturesque beauty and, not unfrequently, of sublimity; the valleys are of great fertility.

It will be seen from the above details that the secondary mountains of the west of Europe are tolerably well defined and continuous in their outlines, and separate the valleys of the Rhine and Rhone, throughout the breadth of the continent, from those of the secondary rivers which flow at right angles to them.

4 *The Aar*.—This river, from the extent of its basin, is more important than its length would indicate; it has four principal sources, each connected with an important chain of lakes: of these the eastern, which is separated from the sources of the Rhine by the projecting spur of the D diberg, rising 11,765 feet, has its rise in the irregular defiles of its northern slopes; under the name Linth, flows by Lake Wallenthal, which also receives the Seez, into Lake Zurich, from whence issuing, it is called the Limmat, and flows with a tortuous course to its confluence with the Aar, about fifteen miles from the lake; just below the lake it receives the waters of the Sill from the left, which flows through a narrow valley extending fifteen miles parallel to that of the lake. Lake Wallenthal or Wallenstadt is ten miles long by two broad, 1385 feet above the sea, and 500 feet deep; the shore on the north side is precipitous, varying from 2000 to 3000 feet in height. The Lake of

Zurich is twenty miles long, two miles broad, and divided into two parts, at about a quarter of its length from the east, by a promontory, reaching from the south to within half a mile of the opposite bank; this division is called Lake Rapperschwyl, and is often frozen in winter. The surface of the Lake of Zurich is 1342 feet above the sea.

The second source of the Aar is formed in the north-east defiles of the St. Gothard; here two streams rising, the one about 8000 and the other 7500, unite at the Hospital, 6976 feet above the sea, receive another from a small lake in the Ober Alp, and turning to the north, rush into the Gap of Uri, a cavern 262 feet long, and through a perpendicular chasm crossed by the well-known Devil's Bridge, and fall into the Lake of the Four Cantons at its south-east extension, known as Lake Uri; the fall of this river within this distance of about twenty miles has been estimated at 4500 feet, but it must apparently be more than 6000, for the elevation of the lake above the sea is not much greater than that of Zurich, being 1380 feet. This lake, called also the Lake of Lucerne, is of very irregular shape, extending for more than twenty miles in length with an average breadth of two miles; it has at the west end two deep indentations to the north and south, which extend ten miles, and give it a cruciform shape at that extremity; the southern receives the River Aa, which flows from Lake Lungern and traverses Lake Sarnen, which is the larger of the two and about three miles in length; the northern, the Muotta-Thal and the waters of Schwaum Lake. The southern and eastern portions of the Lake of the Cantons, especially the Bay of Uri, are of a sublimely wild and savage character; the waters vary from 300 to 900 feet in depth. The Reuss, on leaving the lake, flows through a very narrow valley about thirty miles in length, to its confluence with the Aar; it receives the little Emmen on the left, which has one of its sources in a lake on Mount Pilate; and the surplus waters of the Zuger-see, or Lake of Zug; this Lake is about ten miles long by two broad, and 1361 feet above the sea: it receives the Lorze from the north, which flows from the small Lake Egri on the east.

The two other sources unite to form the river known as the main stream of the Aar; the one rises in the angle at the junction of the Jorat with the Jura Mountains, the other in the glaciers of the Finster Aar horn, about 100 miles distant from each other. The Aar collects its head waters from the northern spurs of the St. Gothard, the Grimsel, and the Finster Aar horn, and the elevation of its sources must be estimated by that of the glaciers; it takes a north-west course through the Valley of Hasli until it falls into the Lake of Brienz, distant about fifteen miles from the pass of the Grimsel; this lake is in length about eight and in breadth about two miles; it is nearly 2000 feet above the sea, and has from 500 to 2000 feet depth; it is surrounded by mountains which pour their torrents into its waters. After traversing the lake of Brienz, the Aar flows through Lake Thun, which is more than ten miles in length, and averaging two in breadth; it is 1896 feet above the sea; its western shores are low and fertile, its eastern irregular and picturesque: it is about three miles from Lake Brienz, and receives from the south the united streams of the Simmen and Kander. On issuing from the lake, the Aar flows in a very circuitous course to the north-west, receiving the Seine, which, bordered by the heights of Berne, has its course parallel to the main stream; and the Saane or Sarine, a stream partially navigable, which flows from the northern slopes of the Diableretz, and about thirty miles from the extremity of the lake is joined by the Thiele from the Lake of Neufchatel, in which the waters of its western sources have been collected, and which flows through Lake Bienne to its confluence with the Aar.

The Lake of Neufchatel extends for above twenty miles, at the base of the Jura; it is about four miles broad, and its area is estimated at ninety square miles; it is 1430 feet above the sea, and its depth does not reach 500 feet; its banks are gently undulating and beautiful, and it receives the waters of several streams; the most important is the Orbe, which issuing from Lake des

Rousses, flows through Lake des Joux, about seven miles in length and famed for its beauty, and after a course of 30 miles in direct distance, enters Lake Neufchatel at the south-west extremity; the Broye, after a course parallel to the lake throughout its entire length, traverses Lake Morant and falls into its north-east extremity; this small but beautiful lake is about seven miles long by three broad: the Reuss falls into the centre of the lake from the western slopes of the Jura. Lake Bienné is distant about three miles from Lake Neufchatel; it is ten miles long by three broad; its elevation above the sea 1419 feet; its depth 400; and it contains the small island St. Pierre.

After the confluence of the Thiele the Aar flows in a north-easterly direction at the base of the Jura, to its junction with the Rhine, nearly fifty miles in direct distance; in this course it receives the Emmen from the right, which rising in the mountain of Brienz, flows for forty-five miles through the Emerstal, one of the most beautiful and fertile valleys of Switzerland; the Suren discharging the surplus waters of Lake Sempach, four miles long by one broad, and nearly 1700 feet above the sea; and the Aa, flowing from Lake Baldeck, three miles in length, and 1530 feet above the sea; and through Lake Hallwyll, five miles long by one broad; and being joined by the Reuss and the Limmrat, besides a few smaller streams, the united waters, flowing over a rugged rocky bed, join those of the Rhine at right angles, about the centre of its course from the Boden-see to the point from whence it assumes a northerly direction nearly opposite the mouth of the Wutach, which flows in a circuitous course from the western slopes of the Feldberg, from which also the Wiesen flows to the south-west, to join the main stream at the commencement of its northern course, while the Birse falls from the northern extremity of the Jura in the opposite direction. It will be observed that both the spurs from the mountains on the north and south project towards each other, and the transverse valleys open into each other in the direction of the chain of the Jura, and of the valley of the Aar; the Rhine valleys, and those of the Thiele and the Reuss, uniting them at nearly right angles. The extreme sources of the Rhine being 175 miles apart, of this distance, as has been seen, 125 is occupied by the sources of the Aar, which are more than sixty in direct distance from its mouth; it has been remarked that both its principal source and embouchure are under the same meridian (about 8° 15' east); it describes an arc of a circle of about 250 miles, from which the chord is distant 100 miles. The volume of water which the Aar brings to the united stream is greater than that of the Rhine, and it might therefore have some claim to the superiority; but the west valleys of the Aar are more open, more insular, less intersected by mountains, and in transverse direction to the principal watershed, showing their inferior origin. The whole of the upper valley of the Rhine is, however, a land of mountain and flood, of which by far the larger portion is inaccessible except to the chamois and the hunter.

The climate of the upper valley of the Rhine is, as might be expected from the proximity of the glaciers and eternal snows of the high Alps, severe in winter, and from the reflection of the rays of the sun often extremely hot in summer; the variations are rapid; winter lasts about six months in the west, but longer in the east: the inferior limit of perpetual snow is about 8500, but the glaciers descend to 3400. The vine ripens its fruit at an elevation of 2000 feet; barley, roots, and herbs at 4000; the slopes of the hills and mountains are covered with timber, oak and beech on the lower slopes, larch and birch above; the pine reaching an elevation of 6700, and the rhododendron and other flowering plants, the edge of the snow. Iron is abundant; lead and zinc are found in the Grisons; mineral springs are numerous; coal is found in the west. The chamois and vulture still have their homes in the tops of the mountains.

5 *Affluents of the Rhine.*—The Rhine, where it issues from its upper valley and takes a northerly course, is 755 feet above the sea, and 550 feet broad; here it changes its character, and instead of flowing with the rapidity

of a torrent over its rocky bed, it winds among islands, and throws out anabranches; and before entering its lower course attains, at the confluence of the Erft, a width of 2300 feet. The river in this part of its course is well-known for the beauty and fertility of the valley through which it flows, and which for about 150 miles is shut in by the wooded slopes of the Vosges and the Schwartzwald.

The principal affluents on the left are, the Ill, which descending from the northern slopes of the Jura, has a course of 100 miles, nearly parallel to the main stream, is navigable for sixty, and receives several small affluents, and opens water communication with the west of Europe; the Moder, which rises in the Vosges, from two sources, has an easterly course of thirty miles, and falls into the main stream just below the confluence of the Ill; and the Lauter, which, rising in the valleys of the Hartzwald, has a course of near fifty miles, besides the Seltzack and other small streams which rise in the northern extremity of the Vosges on the south of the Lauter and the Queist, which fall, with other minor affluents, from the slopes of the Hartzwald to the north.

The affluents of the right are the Elz, which flows from the defiles of the Black Forest in a tortuous north-west course of thirty miles; the Kintzig, which has the same origin and direction, and falls into the main stream, nearly opposite the mouth of the Ill; the Renchen; and the Murg, which flows through a narrow and irregular defile of Mount Kniebis, and has a course of about forty-five miles to the main stream, which it joins nearly opposite the mouth of the Seltzack.

The middle course of the Rhine is by some authors considered as extending to the confluence of the Lippe; there is, however, a marked difference in the character of the basin of the river above and below the confluence of the Neckar: above, the only considerable affluent has a course nearly parallel to the main stream, and the affluents having their courses at right angles are small; below, large rivers turning the flanks of its former watershed, drain their reverse slopes and have basins of considerable area, enclosed on the east by the secondary chains of northern Europe, and on the west by those which have been just described as extending from the Jura and Vosges, and forming the watersheds of the secondary rivers of the west. The middle course of the Rhine, therefore, is divisible into two parts, but they are scarcely to be called basins; the valley of the river itself being still contracted, the basins of which it receives the drainage belonging to its affluents, of which in this, which might therefore be called the lower middle course of the river, the first is the Neckar from the right.

The Neckar rises from several sources in the Schwartzwald and Rauhé Alp, having a north and north-westerly course, and which, forming three principal streams, unite about thirty-five miles from its confluence with the Rhine; its main source is within fifteen miles of that of the Donau; and takes a north-east direction until the junction of the Fils, which has a course of thirty miles from the Rauhé Alp, when it trends northward, and receives the Jaxt from the right; this rises in the same mountain, and has a course of nearly forty miles; the Enz, from the left, then unites its waters, which rise from two principal sources in the north and east slopes of Mount Kniebis, and flows in a tortuous course at the base of the Schwartzwald for about seventy miles. The Kocher, the most important affluent from the right, joins the main stream about fifteen miles below the mouth of the Enz; rising in the north-west flank of the Rauhé Alp, it has a tortuous course from north-east to west, of about the same length as the Enz.

The extreme sources of the Neckar are about eighty miles apart; its course is above 200 miles; but it is shallow and difficult of navigation; it is separated from the Mayn at its sources by the Steigerwald, and at its mouth by the Odenwald; but their inferior affluents of the left and right respectively—the Kocher and Tauber—have not a very well-defined watershed. The sources of the Neckar, as already noticed, open communication with the valley of the Danube.

The Mayn, or Main, is the second most considerable affluent of the Rhine, and affords communication with the upper valleys of the Elbe and Danube, and by its westerly course opens the centre of Europe to the north and west; its principal source is in the Ochsenkopf, and its basin is formed by the Rauhé Alp, the Steigerwald, and Fichtelgebirge on the south, and by the Frankenwald, Rhongebirge, Spessartwald, and Taussengobirge on the north: its upper course, which is surrounded by the watershed of the Altmuhl on the south, and confined between the Fichtelgebirge and Steigerwald, is here due north for about fifty miles from its south-western source, the Rednitz, formed by two streams, the principal of which is the Rezar, from the west, and which, after the confluence of the Pednitz from the east and north, is known as the Regnitz, and receives some affluents from the left; of these, the most important is the Aitsch, the sources of which are close to those of the Altmuhl; this is indeed the main stream, and is navigable to its confluence with that from which it receives its name; from which point it assumes a westerly course; it has two sources, the Red and White Mayn, and receives the Itz and Bannach from the southern slopes of the Thuringerwald.

The Mayn continues in a westerly course for about thirty-five miles, and then trends suddenly to the south, follows that direction for about twenty-five, and then trends north-west for nearly thirty, to its junction with the Saall, which, rising from several sources in the Rhongebirge, Kreuzberg, and Spessartwald, has an irregular course of above seventy miles; here pressed to the south by the Kreuzberg, it flows round the base of those hills, receiving the Tauber from the south, which has a north-westerly course, parallel to that of the main stream, for seventy miles; and again flowing north and west for thirty miles, it receives the Kintzig from the north, and assuming a southerly and westerly direction for about forty miles, joins the Rhine under the fiftieth parallel of north latitude, and here that river takes the same direction until the confluence of the Nahe, which, with its affluents, the Glau and Simmer, in a course of sixty miles, for twenty of which it is navigable, drain the semicircular congeries of valleys formed by the Hartzwald and Hochwald, the northern extensions of the Vosges; and from its confluence, the Rhine takes a north-westerly direction along the base of the Hundsruock, and now receives the Lahn from the right, just before the confluence of its most important affluent, the Moselle; this river flows through a mountainous country for 100 miles, and opens communication with the south-western sources of the Weser.

The Mosel, or Moselle (Mosella), rises in the Faucilles mountains, near the Gap of Bôfort or Belfort, and flows north and north-west between the heights of the Ardennes and the north-western spurs of the Vosges, in a winding course, between undulating banks, through a verdant valley; gradually trending northward, it receives the Meurthe from the right, and changing its character, flows in a rocky channel through a mountainous and well-wooded country, and joins the Rhine after a course of nearly 300 miles, for 240 of which it is navigable. The confluence of the Meurthe is about 190 miles from the mouth of the river; this stream rises in the Vosges, and has a course of about seventy miles; but the other affluent of the right, the Saar, or Savre, is the most important; it also rises in the Vosges, having its principal source in the north-western slopes of the Grand Donon, and its secondary in the Hartzwald, close to those of the Lauter and Nahe. The Saar has a tortuous and rapid course of 150 miles, for twenty of which it is navigable; the Seille, also from the right, has a course of sixty miles; the other affluents of the Moselle are from the left, and are formed by the confluence of the Alzette and Sure with the Erens and other small affluents, which have their rise between the Ardennes and the Eifelberg, from the south-western slopes of which the Kyll also descends to the main stream.

After the confluence of the Moselle, the Rhine flows in a broad, deep, and unbroken stream, between bold hills, through a fertile and well-watered

country, receiving several small affluents both from the right and from the left; of the former, the Sieg is the most worthy of notice, which flows round the base of the Siegburg, and has a course of eighty miles; like the Sieg, the Wied and Wipper flow through a country remarkable for its iron works, in which its principal wealth consists; of the latter, the Erft, which, rising in the northern slopes of the Eifelberg, flows parallel to the main stream for forty miles, and then turning north, joins it after a course of more than sixty miles, affording access to the basins of the Moselle and Maas. From the confluence of the Erft, the extended lowlands about the lower course of the Rhine and Maas commence on the left bank of the river, the right being still hilly, and consisting of heaths and sandy tracts, traversed by the valleys of the Rühre, Lenne, and Emsch, the united streams of which enter the Rhine some twenty miles below; the course of this river is 130 miles, and it drains a considerable area, opening communication with the valley of the Weser.

The only affluent which the Rhine has in its lower course, and which assimilates much with those just enumerated, is the Lippe; but it has its sources in the irregular connexion which exists between the Eggegebirge and the Teutoburgerwald, and drains a valley which is shared, in its upper course, by the sources of the Ems, and opens on the great level which extends from the Elbe to the limits of the basin of the Scheldt. The Lippe has a course of 110 miles, and is a considerable stream, but not of much advantage to internal communication from its want of depth.

The Rhine, in its lower course, becomes an intricate network of 'endless streams,' or canals, intersecting the level country in every direction; it has, however, two main branches; that to the north-west retaining the original name, and that to the south-west being called the Wahal: this latter, in its course of forty-five miles, forms many considerable islands, uniting with the Maas by many branches; from that river, however, it separates again, but unites with it finally after enclosing the island of Bommel. The waters of these rivers, raised thirty feet above the surrounding country, are retained by vast dykes, which enclose rich meadows.

On the right, the main stream of the Rhine bifurcates and joins the Over-yssel; this is, however, by some considered as a canal cut by the Romans. The Yssel rises in the western extremity of the watershed which separates the Lippe from the Ems, from which also it receives affluents on the right; it has a course of eighty miles, and falls into the Zuyder-zee. Below the bifurcation, the Rhine, flowing parallel to the Wahal, again divides, the northern branch still retaining the name Rhine, while the southern obtains that of the Leek; and then again subdividing, surrounds the island of Ysselmonde, and is called Noder-yssel. The Leek joins the Maas in a course of thirty-five miles, and the space between it and the Wahal is called the Betaw. Diminished now both in breadth and volume, the Rhine creeps along until a branch called the Vecht, separating to the right, thirty-five miles from the North Sea, falls into the Zuyder-zee; and the waters of the channel, which still maintains its original name, not having sufficient force to keep open a way to the sea for themselves, were, for above 1000 years,\* lost in the sand, until the hand of man opened and maintained the mouth by which they now find their way to the North Sea.

The total length of the Rhine is estimated at above 350 miles in direct distance; by the stream above 700; the area drained by it at 65,280 square miles; its delta is more extensive than that of any other European river, and is connected with that of the Maas and even the Scheldt. The navigation of the Rhine is everywhere difficult, in the lower course from the want of fall and the number of its channels; in the middle from the islands; in the upper from its rapidity and rocky bed; it is not important above the falls of Schaff-

\* See Lavallée's *Military Topography* dates given, 889, 1807, A.D.

hausen : estimating the elevation of the source as 8000 feet, and that of the point where it issues from its upper basin as 755, it has a fall of above 7000 feet in seventy miles direct distance ; of this eighty is gained at the falls of Schaffhausen, below the Bodon-zee. A higher estimate has, however, been taken ; Lavallee gives 9967 feet as the elevation of the source in the Ober Alp, and 2021 at the junction of the Vorter and Hinter Rhine, or 7245 feet in a direct distance of twenty-five miles : below the Bodon-zee he estimates the elevation at 1335 ; at the lowest level of the upper basin, 771 ; at the junction of the Ill, 463 ; and at Koln, above the confluence of the Wipper, 121, or about one foot in a mile throughout the course from that point. These figures appear, however, exaggerated, if the level of Lake Constance, given by Johnston, be more accurately estimated at 1250 feet.

6 *Rivers of the Valley of the Lower Rhine.*—The entire country between the Rhine and the Weser is low and level, the larger portion of the surface occupied by extensive moors ; the undulating ground about the sources of the Lippe being barren heath, and the coast as barren sand ; but rich strips of alluvium border the watercourses, and the portions drained by canals become capable of supporting cattle ; much of the country is below the sea level, and is protected by numerous dykes. The outline of the coast therefore varies much : the inroads of the sea will form deep bays, and these again, dyked out and drained, are recovered from it to the use of man. The Ems flows through this district, receives the Werse Haase and Leda from the right, and the Aa from the left, near its mouth, draining Bourtangier moor ; and, after a course of 160 miles, falls into Dollart Bay, which was formed by an inroad of the sea in the year 1277. The Hunse, a small river, also drains the same moor, and in a course of fifty miles to the north-west falls into the Lauer-zee, between which and the Zuyder-zee a sandy tract projects about fifty miles into the sea, the distance between the Zuyder-zee and Dollart Bay being about the same. The Veehte, rising between the Ems and the Lippe, has a circuitous course of eighty miles to the north-west angle of the Zuyder-zee, and the Yssel receives the Ahe, Berkel and other affluents, which extend its course to nearly 100 miles. The Zuyder-zee, formerly a lake, was united with the sea by the bursting of the dykes in 1282 ; the numerous islands which extend round its entrance are all the evidence remaining of the extent of the catastrophe ; it is in extreme length forty-five, and in breadth thirty-five miles ; and forms at its south-eastern extremity the deep inlet called the Y, which communicates with Lake Haarlem ; there are four small islands in the zee. Haarlem Lake, now draining by English engineers, was thirty miles in circumference, and resulted from an inundation in the sixteenth century.

The Mass, Macse, or Meuse, may almost be considered an affluent of the Rhine, rising in the Plat of Langres, at the northern angle formed by the junction of the Faucilles mountains ; losing itself underground for four miles, it reappears in a narrow valley between the two heights of Ardennes, and becomes navigable ; and after a very tortuous course enters a defile between rocks 400 feet in height, and flows through a succession of narrow precipitous gorges, after which the country opens with sandy heathy hills, and the river, receiving the waters of the Sambre from the south-west, assumes a north-westerly course ; here, as on the right of the Rhine, iron abounds ; and through the level flat at the base of the hills the river makes a semicircular bend to the north and west, and flows through extensive marshes parallel to the Rhine. Below the island of Gorkum, formed by the two branches of the Wahal already noticed, the Meuse divides, enclosing within its arms numerous islands. The southern arm is the more considerable, and it flows through the Biesboch, or Red Forest, a tract formerly fertile, but destroyed by an inundation in the seventeenth century ; and below this again the stream divides, forming the island of Overflakkee ; the southern arm uniting with the waters of the Scheldt. The most northerly stream retains the name Meuse, and also divides, forming the island of Ysselmond ; its northern branch uniting with the Leck. The three principal mouths of this river are the Maas on the north,

the Flakkee in the centre, and the Greveling on the south, its course may be estimated at nearly 450 miles, of which three-fourths are navigable.

The affluents of the Meuse are, on the right, the Chiers, a considerable stream flowing between high banks among the Ardennes for fifty miles; the Semoy, which in its upper course flows through deep defiles, and has an entire length of 100 miles; the Ourthe, which rises in the northern extremity of the Ardennes, a wild country of ravines and thickets, called Hohe-venne, through which it flows for eighty miles, being navigable for fifty, as are its affluents the Ayvaille and Vesder; and the Roer, which rising in the Eifelgebirge, flows round the base of the Hohe-venne through deep defiles among irregular hills; it is a considerable and rapid stream, and separated from the Erft by a long spur of the Eifelgebirge, from the northern extremity of which the Neers flows through the low marshes of Gueldres to join the Meuse in its lower course. The Roer, or Rhur, has a course of near 100 miles, and from the rapidity of its upper stream is subject to violent inundations. The Niers, or Neers, has a course of sixty.

The affluents of the Meuse on the left are the Viroin (rising from two sources in a plateau 1289 feet above the sea), the Bar, and the Sambre; this latter is the most considerable affluent of the Meuse, and opens communication with the Seine and Scheldt; it is navigable nearly throughout its course of 100 miles, but receives few and unimportant affluents. It is deep, and has a very tortuous course; it is surrounded to the south-west by the heights which extend from the Ardennes westward, and from the watershed of the Scheldt. The country on the right bank of the river is hilly, wooded, and traversed by many streams. The other affluents of the Meuse on the left are the Jaar, or Geer, which flows for thirty miles through the lowlands; the Dommel, which has its sources in the marshes of Peer, flows through a swampy country, and receives numerous streams in its tortuous course of forty-five miles; and the Merke.

The Scheldt, or Schelde, is the last river of importance belonging to the lower basin of the Rhine, and the congeries of streams and canals which find their way through the Low Countries to the North Sea; it rises in several streams from the north and west slopes of the watersheds of the Somme and Sambre. This river, in its lower course, expands to a breadth of above 1500 feet, and flowing in a broad deep stream between embankments, divides and, with its branches, encircles the islands of Walcheren and South and North Beveland, forming the great delta of Zeeland: the East Scheldt, passing between the islands of South Beveland, and Tholen, and North Beveland, and Schouwen, and having effected a junction with the Meuse, enters the North Sea by an embouchure of seven miles in width: the West Scheldt separates into several branches from the islands of Vlaanderen and Zeuwsh, and its embouchure is nine miles broad. The mouths of the Scheldt are opposite to those of the Thames, and its broad and deep stream is more favourable for communication than the more uncertain waters of the Rhine, its valley has been, therefore, the abode of commerce for ages, and may be reckoned among the most populous parts of the world. The course of the river may be estimated at above 200 miles, throughout the greater part of which it is navigable, and its affluents connect it with the valleys of the Somme, Seine, and Meuse in several directions—those of the right are the Rouelle, the Haisne, the Dender, which has a course of forty miles through a coal district, and the Roupel; this is the most important affluent of the Scheldt, and is formed by the confluence of three streams, the Senne, which has a course of fifty miles; the Dyle, which rises in the heights of Fleurus, has also a course of fifty miles, and is navigable for twenty-two, to the confluence of the Deiner; and the Nethe, which is formed by the confluence of two streams of the same name, denominated the Great and Little, respectively, from their junction; this stream is navigable for eighty miles to the Roupel. The courses of the Senne and the Dyle are parallel, and between them lies the forest of Soignies, extending above twelve miles, and intersected by ponds and marshes.



The affluents of the left are the Sensée, which connects the Lower Scheldt with the Lower Scarpe; the Scarpe; and the Lys which descends from the heights bordering the sea, and after pursuing an easterly course, turns to the north and flows parallel to the Scheldt; its length is about 100 miles, and it receives several small affluents; of these the Deule is the most important, as affording communication with the Lys and the Aa, two small rivers, which, with the Yser, complete the drainage of the basin, which extends 250 miles along the coast.

## CHAPTER XV.

### SECONDARY RIVERS OF NORTH-WEST EUROPE.

- § 1. The connexion of the watersheds of north-western Europe.—2. The secondary rivers of north-western Europe. The Seine.—3. Rivers of the southern watershed of the Seine.—4. The Loire.

**T**HE connexion of the Watersheds of North-Western Europe.—The Plateau of Langres, the mountains of Argonne and of Morvan, extend in a semicircular direction, having the diameter of 150 miles from north to south, round the sources of the Seine, the northern extremity trending towards the watershed of the Scheldt; while the southern, attached to the Cevennes by the Côte d'Or, throws out spurs to the north-west, towards those heights which limit the basin of the Seine to the south, and in their extension westward, parallel to the coast of England, form the south boundary of the English Channel.

The plateau of Langres consists of elevated plains, neither separated by deep valleys, nor varied by elevated summits; its height is estimated at 1640 feet; to the south, however, the Côte d'Or rises in bold heights, crowned with woods, and having their sides covered with vineyards; these culminate at about 2000 feet above the sea (Le Tasselot is estimated at 1969 feet), and to the west and north the mountains of Morvan separate the upper basins of the Seine and Loire; these are scarcely worthy the name, their greatest elevation being about 600 feet, and must be considered as the subsidence of the secondary watershed to the west, which stretches gradually to the north-west, towards the plateau of Orleans and the Bocage, hilly and well-wooded districts, forming the eastern extension of the mountains of Bretagne; these are more worthy the name, although their elevation does not exceed 1300 feet, being rugged in outline, and composed of primitive rocks extending into the Atlantic; they form the peninsula of Bretagne, which presents two bold extensions, that of Mont Arree on the north, and Mont Noire on the south, which enclose a deep indentation of the sea, into which the little river Aulno falls from the western fork.

2 *The secondary rivers of western Europe—The Seine.*—The Seine rises in the Côte d'Or at an elevation of 1463 feet, and in its upper valley receives numerous affluents; the main stream may be considered as formed by the confluence of the Seine and Marne, and is continued under the former name to the English Channel.

The principal affluents on the left are the Yonne, rising in the plateau of Chateau Chinon, it has a course of 150 miles, for 100 of which it is navigable; its principal affluent is the Armançon from the right, having a course of about 70 miles; it receives also the Cure and Serain. These affluents, rising in the northern slope of the Morvan, flow through a district deeply intersected and traversed by numerous streams opening on the lower course of the Yonne; here the soil is clay, but fertile, and the slopes of the hills are covered with vineyards. The Loing, the next important affluent on the left, has a course of about seventy miles, rising in the depression already noticed, between the extensions of the secondary and tertiary watersheds of north-west Europe, offers easy connexion between the valleys of the Seine and Loire.

The country at the source of this river is sterile, intersected by barren hills and pools of water, without communication, and the chain of wooded heights rising to the west in the angle formed by these rivers, stretches north and south, about fifty miles. This is the plateau of Orleans, which extends northward in the forests of Fontainebleau.

The principal affluent of the right in the upper basin of the Seine, is the Aube, which descends from the plateau of Langres and flows in a semicircular course at the base of the southern slopes of the hills which separate it from the Marne; it has a course of ninety miles, for about thirty of which it is navigable; in its upper course its right bank is elevated, the left is, however, low and marshy, as is the district through which it flows in its lower course. The Yères is the only other affluent worthy of notice before the confluence of the Marne; its length is about fifty miles.

The Marne also rises in the plateau of Langres, and flowing above 200 miles, for the most part parallel to the upper course of the Seine, joins that river where their united waters assume the north-west direction, which is maintained throughout the rest of their course to the sea.

The entire length of the Marne is about 225 miles; it receives from the right the Ornain and Ourcq, and from the left the Grand and Petit Morain; the former has a course of above fifty miles, the second, which affords connexion with the main stream by canals, only of thirty. By the valley of the Marne and its affluents, access is obtained to the basins of the Meuse, Moselle, and Rhine.

The semicircular tract lying at the base of the plateau of Langres, between the Seine and the Marne, though undulating, is sandy, cold, and barren; to the west, however, the valley opens on rich clay land, which is highly productive; about the sources of these rivers good timber is found, and iron ore is abundant. The upper valley of the Seine and Marne is a circular basin of about 100 miles in diameter; its eastern districts are among the most barren, its western among the most fertile, in Europe; this is nearly level, and extends into the basin of the Oise.

The Oise is the largest, if it is not the only considerable affluent of the lower course of the Seine; it rises in the western Ardennes, and opens communication between the basins of the Seine and Scheldt, the Sambre and the Somme; it has a course of about 110 miles. The upper valley of this river is well wooded and fertile; limestone abounds, as do corn and cattle in the lower; it flows through a gently undulating and open country; but its principal affluent, the Aisne, which rises among the western terraces of the Argonne, flows through a country rendered difficult by woods, marshes, and ravines, as does the Lette, an inferior affluent of the Oise; nevertheless, the Aisne opens communication with the Meuse; it receives the Aire, the Vesle, and many smaller streams, and is in length 120 miles. The district between the Marne and Aisne may have an average breadth of thirty miles; a spur of wooded hills projecting from the Argonne, separates their upper course, the lower opens on the plain, which extends about the points of junction of the three great sources of the Seine.

From the confluence of the Oise the Seine has a course of about eighty miles in a direct line to the sea, during which it receives several small affluents, the most important of which are the Essonne, which rises in the plateau of Orleans, and has a course of about fifty miles through a highly fertile district, and the Eure, rising in the plateau of Courville, having a course of above 100 miles from the left. The lower valley of the Seine is of great beauty and fertility. The river reaches 500 feet in width before the junction of the Oise; its entire length exceeds 400 miles, and it is navigable for 350, but its mouth is obstructed by dangerous sandbanks; it enters the sea by an estuary seven miles wide, from the mouth of which large vessels ascend to above thirty miles in direct distance.

To the north of the Seine the Bresle, the Somme, the Authie, and Cauche flow into the English Channel; of these the Somme is alone of any importance; its basin is formed by encircling hills, not exceeding 500 feet in eleva-

tion, and it does not extend above seventy-five miles in length by forty-five in breadth, but it is of much fertility, and opens a direct passage into the centre of the basin of the Seine by the valley of the Oise, as well as with that of the Scheldt; hence its historical and commercial importance. Its entire length exceeds 100 miles.

3 *Rivers of the Southern Watershed of the Seine.*—The rivers which have their rise in the extension of the southern watershed of the Seine are the Touques, which has a course of fifty miles, and is navigable for twenty; it rises in the northern slopes of the Bocage, as does the Orne, which has a course of seventy miles, but is only navigable for about seven: the Vire, which flows from the same slopes for sixty miles, and is navigable for twenty: the Douve, which receives several affluents, one of which, the Taute, is navigable for fifteen miles, the Sienne, which has a course of forty miles, the Silune and the Couesnon, having a course of about fifty miles, and is navigable for ten, rise among the granite rocks of the interior of La Manche, and unite with the sea in the sandy coast of the deep bay which terminates the north-west coast of Europe.

The southern watershed of the Seine assumes more importance when considered as the northern and eastern limit of the great basin which extends into the Bay of Biscay, than when simply considered as separating the valleys of the Seine and the Loire. This basin, extending from north to south 300 miles, and above 500 from east to west, is quadrangular in form, its eastern boundary stretching from the slopes of the Mediterranean to the plateau of Orleans, is above 250 miles in length, its southern, on the line of the Pyrenees, 550, and its northern, from the plateau of Orleans to Ouessant, nearly 300. As, however, it is divided into two parts by the extension westward of the mountains of Auvergne, which form the southern limit of the basin of the Loire, and as, with this exception, the watersheds of that river are the reverse slopes of those of the Seine, that river may properly come next in order of description.

4 *The Loire.*—The river Loire has its sources in the mountains of Auvergne, of Charolais, and the Côte d'Or, and its course is naturally divided between two valleys, where, turned by the plateau of Orleans, it flows westward to the sea; each of these may be about 200 miles in length, the upper extending about 100 miles in width, the lower opening from the sources of its northern to those of its southern affluents, about 200. The principal source is in the Gerbier de Jones, at an elevation of 3940 feet, and the river flows through deep defiles, among the extinct volcanic cones of Auvergne; it receives from the right the Furens, which, descending from Mount Pilate, affords connexion with the valley of the Rhone; the Arroux, flowing from the slopes of the Côte d'Or, over a rocky bed, but nevertheless navigable for above ten miles; the Nièvre, which is navigable for about the same distance, and has a course of twenty-five miles; and from the left, the Lignon, rising in Mount Forez, and several other small streams above the confluence of the Allier.

The Allier rises in Mount Lozère, which has an elevation of above 4500 feet; it has a course of above 200 miles, and is navigable for 150; rising in so mountainous a country, it is subject to inundations, and its affluents are scarcely more than rivulets; of these the more important are the Dor and Sioule. The upper basin of the Loire is divided into three parts, the basins of the Upper Loire, of the Allier, and of the united streams; the general course of all is north and west. The basin of the Allier is the more contracted, shut in between the basaltic precipices of the Puy de Dôme; its valleys, however, are fertile, and the vegetation celebrated; it abounds in mineral products, in coal, antimony, lead, iron, marble; it has numerous mineral springs, those of Mont Dor being the most noted. The chestnut-tree attains here a magnificent development, and its nuts afford food to many of the inhabitants of the poorer districts. The basin of the Loire, extending from north to south 150 miles, and having the valleys of its affluents opening into it from the south, east, and north, is of a more varied character on the south and west, and assimilates more indeed to that of the Allier; but on the south, on the slopes of Mount Mezin,

which attains an elevation of 5794 feet, and of the northern extension of the Cevennes, in the Margerides, and the mountains of Charolais, its character varies; much of this district is comparatively sterile; coal and gypsum are found here, and the vine is cultivated; but to the north, on the wooded slopes of the Côte d'Or, that important plant flourishes in the greatest luxuriance, as the southern exposure affords a better climate, and the soil is more fertile. The upper courses of the Loire and Allier are very rapid; after the confluence of those rivers, the united stream flows for eighty miles through a narrow valley, not averaging above ten miles in width, the upper part being less fertile and much covered with wood; here it receives no affluent worthy notice, but at the angle formed by the change in its course, below the plateau of Orleans, connexion is obtained with the valley of the Seine; in the lower course of the river the affluents are of more importance, and extend their ramifications in every direction; the more important on the left are:

The Loiret, which rises from two sources; one of these forms a basin about sixteen yards in diameter, and is only seven miles distant from the main stream; although this river has a course of only ten miles, it is navigable to its source, and affords water power and carriage to the manufactories situated on its banks;

The Cher, which descends from the north-west spurs of the mountains of Auvergne. Like the Allier and Loire, in its upper course, this river is subject to violent inundations; it has a semicircular course of ninety-five miles, and is navigable for about fifty; it has several affluents, and flows through a well wooded and fertile country;

The Indre, which has a course of above 100 miles, and is navigable for forty-five, through a level and fertile country, some portions of which are, however, swampy; the vine flourishes, and with cattle and agricultural products form the wealth of the district;

The Vienne which, descending from the plateau Millevaches, flows in its upper course through a narrow and deep valley for fifty miles from east to west, from thence it assumes a northerly direction for about eighty more, to the confluence of the Creuze, and then bending westward for about thirty more, joins the main stream; its eastern course cannot be less than 200 miles, and has two important affluents; the Clain on the left, which opens communication with the valleys of the Charente and Gironde to the south, and which, though it has a course of above sixty miles, is navigable only for five; and the Creuze on the right, which, rising in the mountains of Limousin, flows for nearly 150 miles through a rugged and sterile country, and is navigable for the last ten miles of its course; it receives several affluents, the principal of which is the Gartempe, which has a course of 120 miles; none are however important. The other affluents of the Loire from the left are the Thoué, the Sèvre-Nantaise, and the Boulogne; of these, the second is of some importance, having its rise in the plateau of Gatine, which forms the watershed between those affluents of the Loire and the small streams which flow into the sea, between the mouth of that river and the Charente; it flows with great rapidity in a deeply excavated channel through the rugged wilds of La Vendée, it has a course of seventy miles, and is navigable in its lower course for boats only; its most important affluent, the Maine, has a course of about thirty miles.

The streams falling from the opposite slope of the same plateau into the sea, are the Sèvre-Niortaise, with its affluent the Vendée, the Say, the Vic, and the Falleron; the former has a course of about sixty-five miles, which is navigable for some distance. Besides those already mentioned, the Erdre, also an affluent from the right, joins the main stream opposite the mouth of the Sèvre-Nantaise, has a course of about forty-five miles, and is navigable for sixteen; its waters afford communication with those of the Vilaine. The remaining affluent of the Loire from the right is the Mayenne, and is formed by the confluence of three streams, the Mayenne, the Sarthe, and the Loir; the former rises in the southern slopes of the Bocage, and flows through a broken country, not dissimilar to that through which the Sèvre-Nantaise flows; but, as its name implies, more

wooded and indeed more fertile; it is navigable for about eighty miles, and is above 100 in length; the Sarthe has a course of about 140 miles, is navigable for seventy-five; it rises in the hills which form the watershed of the Orne to the north; to this river the Loir is affluent; it has a course of 150 miles, is navigable for above sixty, and has its source in the little lake of Cernay; after the confluence of the Sarthe, the united stream is called the Maine.

The Loire in its lower course, which is between continuous lines of fertile terraces, is shallow, yet it is equally subject to inundations with the upper course, and dikes and barrages are constructed to confine the waters, which, under ordinary circumstances have been found sufficient, though many were destroyed in the flood of 1846. It forms several islands, of which, perhaps, those of the port of Nantes, and Indret, near the mouth of the river, are most important; the navigation is obstructed by sandbanks, yet vessels of 300 tons can enter its mouth, and vessels of 200 ascend to the confluence of the Sèvre-Nantaise, to which point also the tidal wave is perceptible; its length may be estimated at 550 miles, and it is navigable for above 400. The small rivers which flow through the extension of the basin of the Loire to the north are, the Vilaine, Blavet, Odet, and Aulne; these have their rise in the southern valleys of the peninsula of Brittany, a country of forests, wastes, and granite rocks; the former has a course of above 100 miles and is navigable for eighty, it receives the Ille and Oust, and opens communication with the valley of the Loire by the Erde, and with the Aulne on the north-west; this latter, as already noticed, falls from the western fork of the tertiary watershed of Western Europe into the harbour of Brest.

## CHAPTER XVI.

### WATERSHEDS AND RIVERS OF THE SOUTH AND WEST.

§ 1. The watersheds of the south and west.—2. The Garonne.—3. The Nivelle and Adour.

**THE Watersheds of the South and West.**—The line of waterparting between the rivers of the west and the south of Europe is very tortuous. It has been already traced from St. Gothard, along the peaks of the Bernese Oberland, the line of the Gemmi, the slopes of the Jorat, to the most elevated of the parallel ridges of the Jura, and to the centre of the water communication of the west, where the upper valleys of the great rivers meet round the plateau of Langres; from thence, above the vine-covered sides of the Cote d'Or, the well-wooded Lyonnais and Charolais, among the rocky heights of the Cevennes, and the volcanic cones of Auvergne, to the rugged peaks of the Pyrenees, culminating in the east in that of Corlitta. A well-defined limit is, however, placed to the secondary chains of the west, and the continuity of the line is broken by the gorge of Narouz, of which the elevation is only 620 feet; from thence the range of the Corbières stretches to join the Pyrenees. This does not attain a greater mean elevation than 1000 feet; but its culminating point, the peak of St. Bartholomew, reaches 7654, and forms the northern limit of the basins of the Tech Tet Gly and Aude. A spur called the Albères limits the valley of the Tech, and the mountains of Baresges in a similar manner form the eastern cincture of the basin of the Nivelle and the Adour; here are more lofty peaks, that of Cambelle rising 9843 feet, and the mean elevation being 6500 feet. In the north, however, the decrease in elevation is very rapid, and the spurs of this chain present only gentle undulations between the valleys of the Adour and Garonne.

The Pyrenees, by some distinguished as the Continental Pyrenees from the Cantabrian mountains, or sierras of the Asturias, on the west, extend for 250 miles, from Cape Creux on the east, to Cape Figuiet, or to near Fuentarabia, having a mean altitude of near 8000 feet. Of this chain

the great mass is near the centre, to the east and west of which it is composed of two lines, running parallel, the one overlapping the other, rising from the south in successive terraces, but sloping more gently to the north, spurs extending on both sides from transverse valleys, those on the north more open, those on the south more rugged and difficult; while from the centre the great transverse range which crosses the Peninsula extends to the south, throwing out its massive spurs to the east and west. On the east, the spurs projecting into the valley of the Ebro are remarkable both for extent and elevation, the most easterly extending like a wall along the coast, and with the opposing spurs of the Sierra Penagolosa confining the middle course of the Ebro and its affluents within an extensive basin; while the eastern extremity of the chain sinks close down to the waters of the Mediterranean.

The main line of the Pyrenees is formed of arid and precipitous rocks, covered with snow and ice, but not presenting vast glacier fields like the Alps, nor are the culminating points nearly as lofty, but they are not less mountainous in their character. Three peaks rise to an elevation of 11,000 feet and upwards, viz., Nethou or Maladetta, Posets, and Perdu; three more attain to about 10,000, viz., Vignemale, du Midi, and Canigou; these, as in other cases have been similarly observed, project from the great mass of the chain, and are found rising above its southern slopes.

If we divide the Continental Pyrenees into central, eastern, and western, we shall find but few passes over the first, and those only to be traversed by mules; the principal of these connect the sources of the Adour and Cinca with those of the Arriège and Sègre.

In the eastern Pyrenees the most important pass is the Col Pertus; it is passable at all seasons, and is the great eastern high road. This, however, is turned by the two converging lines of communication by the valleys of the Lech and Let, the gorge of La Perche, and the Boulou.

In the western Pyrenees, one leading through the gorges of Bellatti and Maga, the former over the main chain to the valley of the Nivelle; the pass of Roncevaux, or Roncevalles, by the gorge of Ibancetta, at an elevation of 5750 feet, along the crest of the mountains, and that of Confranc; these are practicable for carriages. The total number of passes is estimated at fifty, and among the more elevated are Port d'O 9843 feet, Breche de Roland 9500, Estaube 8402, Tourmalet 7143, Gavarni 7654.

The central mass of the Pyrenees consists of primitive rocks, of which granite and schist form the larger portions. Connected with these are found the earlier limestones; but the secondary rocks superimposed upon them occupy a far more extensive area, consisting chiefly of clay, slates, and limestones, while below these the inferior ranges are formed of oolite and chalk.

Iron, copper, lead, gold, and silver have been worked in the Pyrenees. Some of their streams are even yet argentiferous; and they are remarkable for a vast deposit of rock salt. In the valley of Cardona, mineral springs are abundant, and fine marble is quarried in several localities. The elevation of the snow line is about 8000 feet; the pine tree flourishes at 10,000 feet, and maize is cultivated at 3280. In the upper valleys there is occasionally excellent pasturage, and in the more elevated portions of the chain, and on the limits of the snow region, both the bear and the lynx are still found. The extension of the chain to the west, usually known as the Maritime Pyrenees, commences at the gorge of Goritty, where a spur stretches to the north, limiting the south-east angle of the Bay of Biscay; these subdivide into the Gallician, Asturian, and Biscayan Sierras; they are, even as yet, little known. The elevation must, however, be considerable, as many of the higher peaks rise above the snow line; and the Pena di Peneranda is estimated at 8038 feet.

The gorges which cross these mountains are few and difficult; that on the west connecting the valley of the Minho with the harbour of Corunna; one connecting the valley of the Duero with that of the Ovia and Nora, rivers or rather streams, falling into the Bay of Biscay; and a third over the Sierra Regnosa, connecting the upper valleys of the Ebro and Duero with the harbour

of Santander; to the east again, there are the gorge of Salinas, the high road from Spain into France, and the pass of Goritty.

The northern slope of these mountains extends 300 miles from east to west, but has only a breadth of thirty-seven miles, and the greater portion of this surface is covered by spurs projecting towards and into the sea. There is, however, a considerable area of pastures, and the forests are extensive.

Some streams, scarcely to be called rivers, flow rapidly down this slope to the sea, through fertile and beautiful valleys. These are, the Nalon, formed by the confluence of the Ovia and Nora; the Ansa, the Deba, which rises in the gorge of Salinas; the Orola, the Ovia, which rises in the gorge of Goritz; and the Bidassoa, which, descending from the gorge of Maya, flows through the valley of Bastan, and enters the sea near Cape Figuer. An island is formed at its mouth, which, with the entire course of the river, has become famous in the wars between France and Spain.

2 *The Garonne*.—The ancient Garumna, with its confluent the Dordogne, unites to form the Gironde, the extensive estuary of which is one of the most remarkable features on the western coast of France.

The Garonne, rising in the valley of Aran, flows through a deep and narrow valley in a semicircular course, until it assumes an uniform north-westerly direction, through its central and lower basins. The upper basin is a mountainous forest region, abounding in pasturage and mineral wealth.

The affluents of the Garonne from the left are, throughout its course, few and unimportant: the Save, Gers, Baise; but those of the right are considerable, both in number and extent.

The Salat, which may be considered the secondary source of the Garonne, rising in the angle formed by the junction of the Lower Cevennes with the Pyrenees, has a course of sixty miles, and is navigable for twenty. The Arriège falls from the peak of Corlitta, and flows through a narrow valley hemmed in by mountains. The Ern, a small river, having its course parallel to the main stream; and the Tarn, which, rising in the wood of Armes, on Mount Lozere, at an elevation of 2526 feet, afterwards flows in a deep bed through a fertile plain in a course of 220 miles; its affluents are the Aveyron, on the right, and the Agout on the left: the former is to be noted for the quantity of detritus brought down by its waters. The Lot, also rising in the Cevennes, has a course of 250 miles through an agricultural district, but its bed is obstructed, and navigation difficult: its affluents are the Fruyere and Selle.

The Dordogne, formed by the confluence of two streams, the Dor and Dogne, flowing from the volcanic heights of Mount Dor, has a course of 225 miles, and is navigable for 150; after its confluence with the Garonne, the united stream is about 4600 feet in width, and here the flood tide assumes the character known as The Bore, locally denominated Mascaret; it has numerous affluents, the principal of which are the Cère, the Vezere (navigable for twenty-five miles), and its affluent the Corrèze; and the Lisle, which flows through an extensive valley, and is navigable for seventy-five miles. The central basin of the Garonne and Dordogne may be above 100 miles from north to south, and fifty from east to west; it is composed of broad valleys, undulating hills, well-wooded plateaux, and is rich in corn and wine. The lower basin, which may have about the same extent, presents barren wastes of sand, dreary landes, and shifting dunes, which, as in Egypt, Cornwall, and other similar coasts, make regularly progressive encroachments; a few plantations of pine have withstood the invasion, and here and there a few marshes and oases of verdure break the monotony of the landscape. Marshy bogs and salt lagunes extend along the sea shore. This river is the medium of communication between the south of France and the Mediterranean, by the Canal du Midi; in its upper course, its velocity has been estimated at 164 feet per minute; at the mouth, its breadth is above 2500 feet, and its depth seventy-five feet. After the confluence of the Dordogne, the stream, now called Gironde, forms an extensive channel, intersected by islands and sandbanks, varying in breadth from two to nine

miles, but is only three miles wide at its mouth. It is in length forty-five miles.

3 *The Nivelle and Adour.*—The former of these, falling from the Pyrenees into the Bay of Biscay, is a torrent; but its name is too well known for it to be omitted. The latter is a more considerable river, with several affluents. Descending from the Pyrenees on the south, its basin is encircled to the east and north by the Barèges mountains, which gradually descend into the landes of the Garonne. The river flows at the base of the semicircle thus formed, and its affluents flow parallel to its course. The central basin partakes of the character of that of the Garonne, the valleys being fertile, the hills affording rich pasturage, and being productive of wine. The lower basin also, like that of the Garonne, consists of unproductive plains, while the upper basin is an Alpine region of mountain, flood, and forest, crowned by the snows of the Pyrenees.

The Adour descends from Mount Tourmalet, 6300 feet above the sea, flows through the valley of Campan, where it is 1670 feet above the sea, which it reaches after a course of 175 miles, for seventy of which it is navigable; it has numerous affluents, those of its upper basin are torrents. The more important are the two named Luy, torrents flowing parallel to the main stream throughout the greater part of its course; the Gave (*i.e.* Water) de Pau, descending at its source in the cascade of Gavarnie, 6748 feet above the sea; it receives the Gave d'Oleron, and has a course of 100 miles; the latter stream is formed by the conflux of the Gave d'Aspe and Gave d'Opan, each having a course of thirty miles; the Bidouze, though a torrent in its upper course, is navigable for twelve miles; the Joyeuzé; and the Nive, the most important of all, which descends from Mount Orgulo, though small it is deep and rapid, navigable for twelve miles, and receives the Bayunza, is separated from the Adour by plateaux extending from the Barèges; these are all on the left. Those on the right are few and unimportant, except the Midouze, which is formed by the confluence of the Midou and Douze; the former has a course of forty-five miles to the confluence of the streams, and their united waters about twenty miles to the main stream; they are navigable for twenty-five miles.

## CHAPTER XVII.

### THE SOUTH-WEST PENINSULA.

- § 1. The Spanish Peninsula.—2. The watersheds.—3. The rivers of the west.  
4. The rivers of the east.

**T**HE Spanish Peninsula.—The Iberian Peninsula, familiarly and not improperly known in this country as the Peninsula, as being not only the nearest but the most important Peninsula in Europe in respect of Great Britain, extends between lat 36° 1' and 43° 45' north lat., and 3° 20' and 9° 30' west long.; its continental boundary is 225 miles; its diagonal 621; the development of its coast line 1615 miles, and its superficial area above 175,070 square miles. Few portions of the earth's surface are more singular in their character.

2 *The Watersheds.*—The Pyrenees on the north, as already described, and the Alpujarras, or Sierra Nevada, on the south, form mountain barriers, presenting steep faces to the sea, and connecting them a watershed, irregular both in direction and elevation, stretches in a general northerly direction; indeed, the two points of junction with those chains are almost exactly due north and south from the eastern extremity of the one to the centre of the other at the sources of the Ebro; thus dividing the Peninsula into two parts, the one nearly rectangular, having its greatest length from north to south, the other triangular, having for its base the eastern Mediterranean coast.



This watershed is formed by mountains, which assume a sinuous course, and rise from plateaux varying in elevation from 1300 to 2000 feet; above the rugged sierras raise their snow-capped peaks; below vineyards and corn-fields, rice, maize, and olives, the products of the temperate and tropical zones, are found side by side; while in the lower valleys the latter prevail. Wherever there is water there is verdure, where it is wanting the country is an arid waste, a sandy or a rocky desert.

On the south the Alpujarras extend from the Atlantic Ocean and Cape Gata in a slightly curved line from east and west for 150 miles; and here are the most elevated summits in the Peninsula; the Cerro de Mulhacen 11,675; and the Pic de Veleta 11,387 feet in height, which are separated by the Corral de Veleta, a fearful chasm. These heights intercept the rain clouds from the ocean, and cause the rainfall on the central plateaux not to exceed ten inches annually; by this the fertility of the valleys is, however, much increased, and probably they may be estimated among the most beautiful as well as the most fertile on the surface of the earth. The limit of perpetual snow on these mountains is 9500 feet. At the south-western extremity the isolated rock is projected which forms at once the key and the limit of the Strait of Gibraltar; it is three miles in length, and nearly one in breadth; it rises abruptly on three sides to the height of 1600 feet; its more prolonged slope being towards the west. The rivers of the southern slope of the Alpujarras are scarcely worthy the name. The Guadiaro, however, which flows into the sea eleven miles east of Gibraltar, has a course of forty miles; the elevation of its source must be above 5000 feet. The Guadaljoro and Almeida may also be mentioned. These mountains are rich in minerals, especially in lead; their sides are clothed with olives, chestnuts, and the lower slopes with orange groves.

Between the Alpujarras and the Pyrenees, three chains, parallel to each other and to these, stretch from the central watershed to the west, forming the well-defined basins of the Guadalquivir, the Guadiana, the Tagus, and the Ebro. The first of these, the Sierra Morena, presents for the most part barren rounded masses, which culminate at Aracena, 5500 feet above the sea. The southern slope presents rich, well-watered, and deep valleys, for the most part uncultivated; it is crossed by two principal passes, as well as by the formidable defile "Despena Perros," which communicates with the Guadiana. The length of this chain may be 250 miles, its breadth fifty. The second of these chains is attached to the central watershed by a level, slightly elevated, and extensive plateau, which affords free access from the head waters of the Guadalquivir to the Guadiana; the Sierra de Alcaraz thus connects the Sierra Sacra, which joins the Alpujarras with the Sierra Cuenca to the north. This chain extends 350 miles, and occupies the entire country between the rivers, being in breadth about fifty miles; its course is very irregular, and it culminates near the centre in the Sierra Guadalupe, at an elevation of 5250 feet; its western extremity reaches the sea on the southern bank of the Tagus. The Sierra Monchique, which forms Cape St. Vincent to the south, seems from its contour to belong more properly to the extension of the Sierra Morena, if it be not considered as distinct from either; it culminates at 5000 feet. The upper valley of the Tagus is open to that of the Guadiana, as that is to the valley of the Guadalquivir. The central watershed is here continued in a semicircular direction from the Sierra Cuenca by the Sierra Albarracin, which indeed may be considered as the centre of divergence of the chains on the south. Here the head waters of the Tagus, the Xiloes, the secondary source of the Ebro, the Guadalaviar, and Xucar, are in close proximity; from hence, also, the Sierra Molina stretches to the north-west, though separated by a depression which gives access to the valley of the Duero from the lower sierra; it is very precipitous and rugged. The pass over this chain is 5250 feet in elevation, but the culminating point is farther west in the Sierra Guadarama, which nearly reaches 9000 feet, and is crossed by the gorge of the Lion, above 4500 feet in height. This chain is separated from the still

more lofty peaks of the Sierra Credos, which attain to 10,500 feet, by the Sierra Avila, of little elevation indeed, but barren and desolate, by which passage is opened with the centre of the valley of the Duero. The Sierras of Creda and Gata are remarkable for the boldness of their southern slopes. The former is crossed at the gorge of Banos; the latter is partially detached, but unites at the west with the Sierra Estrella, which, culminating at 6500 feet, sinks gradually to the south and west, extending in the mountains of Cintra and Torres Vedras, to Cape Roca, and forming the northern limit of the mouth of the Tagus. The rugged shores and wild valleys of the Sierra Estrella afford access only in one direction to the valley of the Duero, and present therefore an almost impassable barrier.

The central watershed to the north of the Soono Sierra is formed by the Sierras Moncayo and Oca. The former rises nearly 10,000 feet, decreasing gradually to the north, the latter scarcely exceeds 5000, beyond which again there is a depression. Between the head waters of the Ebro and Duero, in their northern sources, there are the elevated plains which connect it with the Sierra Reynova, the centre of the Pyrenees; the two valleys are connected by the defile of Pancobo.

On the east, the Sierra Almanza separates the Segura from the Xucar, between which river and the Ebro the Sierras Cuenca and Alboracin send out irregular spurs, which enclose the valley of the Guadalaviar. One of these, the Sierra Penagolosa, extends northward along the coast to the Ebro, contracting the valley of that river on the south, as a spur from the eastern Pyrenees does on the north.

3 *The Rivers of the West.*—The Guadalquivir (Wad-al Kebir, or Great River of the Moors; the Bætis of the ancients), has its rise in the depression between the Sierra Nevada and the Sierra Sacra, from two sources in the opposing slopes; its upper course is through a rugged and sterile country, but lower down the valley opens and becomes fertile, and its lower course is through a level and highly productive country; on approaching the sea, however, it forms three channels, by two anastomosing branches enclosing islands, named respectively major and minor. Here the alluvial deposits afford the richest pasturage for cattle. Thirty-seven miles from the sea a desert tract called the Marisma, commences, and to the north this is extended over a surface of 150 miles. The length of this river is above 250 miles. It is navigable above its confluence with the Genil.

The affluents of the Guadalquivir are numerous, but very important. Those on the left, in its upper basin, flow from the slopes of the Alpujarras, and are mostly saline; of these, the Genil, or Xenil, and its affluent the Loxa, which has a course of about 120 miles, demand notice. On the right, the Guadalimar, and its affluent the Guadarmena; this river is shallow, but rapid, and has a course of seventy miles from its source in the Sierra Alcaez. The Guadiel and other torrents come down from the ravines of the Sierra Morena; of these, the Huebla may be mentioned.

This basin is rich in minerals, mercury, silver, lead, and salt; it has marble quarries, and supports numerous herds of the finest horses, cattle, and sheep; it is, however, comparatively uncared for by an indolent and decreasing population.

As connected with the basin of the Guadalquivir, the river Guadalete should be noticed, which, rising in the northern slopes of the Sierra Ronda, flows through the plains of Xeres into the sea, to the south of the former river, after a course of seventy-five miles; to the north, also, the Tinto, an inconsiderable stream, enters the sea.

The Guadiana (Anas) must not be confounded with a small affluent of the Guadalquivir on the left; it has its sources in the Sierra Alcaraz, near those of the Guadalimar, on the south, and in the mountains of Toledo and the Sierra Cuenca on the north; the southern source is in marshy lagunes; it is afterwards lost underground, but rises again thirteen miles lower down, in numerous boiling jets, called "the eyes of the Guadiana;" from hence it flows in a deep,

full stream, through a comparatively sterile country, till its course is interrupted and made tortuous by spurs from the mountains, which limit its basin; by these it is gradually turned to the south, and before entering the sea has a slightly easterly trending. In the first part of its course this river flows through a very narrow defile, round the base of the western extremity of the Sierra Morena; its basin river, though uncultivated, is not, especially in its middle course, unfertile; it is navigable for thirty-five miles, and its entire course may be estimated at nearly 100. The principal affluent is the Zuja, famed for its quicksilver mines; the torrent, Albuera, however inconsiderable in size, will not be forgotten in history. On the right, the affluents are for the most part small; the Ginguela is, however, of importance, if it be not considered as the main source of the river. The southern source of this stream, called the Reuss, rises in a marsh, from which the Xucar flows in the opposite direction to the Mediterranean. The Ginguela has several affluents.

The Tagus, Tajo, or Tejo, rises from several sources, in the amphitheatre formed by the Sierra Alboracin; its upper course, in which it receives numerous small affluents, is through a barren, arid country, incapable of producing anything but stunted pasturage and shrubs. The middle course of the river, where its sources unite, is more fertile, until, forty miles below, its basin is contracted by spurs from the mountains on either side; its course is now through a rugged, barren country, its bed contracted, and its stream rapid and broken; below it expands, being 300 yards wide 100 miles above its mouth; in its lower course it forms numerous channels and islands, and then expands into an estuary five miles broad, but again contracts to two at its mouth, which is crossed by a bar. The entire length of the Tagus may be estimated at 500 miles, for eighty only of which it is navigable, to the entrance of the mountain regions, below its central basin.

The affluents of the Tagus on the left are, for the most part, inconsiderable torrents; but the Sever and Zatas in the lower course should be noticed. The latter rises near the northern bend of the Guadiana, and has several affluents, flowing through a desert country; those on the right are more important, viz., the Xarama, or Jarama; the northern source of this river is formed by the confluence of that stream with the Henarez; it receives the Mancanarez from the right, and has a course of sixty miles; the Guadarama, which rises in the sierra of the same name, at an elevation probably exceeding 4000 feet; the Alberke; and the Alagou, a stream of some consequence, as opening communication with the valley of the Duero, and flowing through the depression between the Sierra Gacta and Sierra Credos; its principal affluent is the Xente; the Zezere, which rises in the defiles of the Sierra Estrella, and flows through a wild and mountainous country; and the Alenquer, which flows at the foot of the mountains between the Tagus and the ocean to the north, and the Alcantara, a rivulet important as flowing through Lisbon, the capital of Portugal.

The Sadao, or Saldao, which rises in the Sierra Mouchique, and drains a small coast basin between the Guadiana and Tagus, has a course of above 100 miles, for forty of which it is navigable: it falls into the Bay of Setubal.

The Duero, or Douro, rises in the lagunes, and in the semicircular plateau at the base of the Sierra Moncayo; here, on the most naked and lofty parameros, surrounded by gloomy mountain fastnesses, it flows in a deep and narrow bed, until, at its confluence with the Pisuerga, its numerous sources are united at the limits of its upper basin. This river rises in the plateau of Reynosa, in close connexion with the sources of the Ebro; of its numerous affluents, the most important are the Arlanzou and Esquera on the left, and the Carrion on the right; its course may be estimated at 150 miles. Above its confluence with this principal source, the Duero receives the Eresma from the left, which has its rise in the Sierra Guadarama, at an elevation probably approaching 5000 feet; and, with its affluent, the Ajada, flows through a very wild district. The upper basin of this river, which may be 100 miles in length, and the same in breadth, is dreary and monotonous in its character, and in

it some of the affluents of the middle course of the main stream take their rise.

The affluents of the middle course of the Duero are on the left. The Tormes, which falls from the Sierra de Credos, a considerable stream, which has a course of 150 miles; and on the right the Sequiera, which opens communication with the Pisuerga; the Eyla or Elsa also, which rises in the sierras of the Asturias, and collects from their southern valleys numerous affluents: of these, the Torio and Tuerito may be noted. The upper basin of this river has an elevation of 2500 feet, and its length may be estimated as above 100 miles. In its middle course, the Duero, headed, as it might be said, by the spurs from the mountains of the Asturias, turns to the south at a right angle, so that its affluents on either bank falling into it at right angles are parallel to the other portion of the course of the river, which thus forms a triangle, having its base eighty, and its eastern and western sides sixty and forty-five miles respectively. The country through which it flows is still barren and rugged.

In its lower course the Duero receives on the left the Agueda and the Coa, which both fall from the Sierra Gata, and are separated by the plateau of Fuentes d'Onoro; both are rapid, have precipitous banks, and flow through a mountainous country. The Sabor, Tua, and Tamego are small streams on the right.

This river brings down, in its rapid course, a vast quantity of detritus from its upper basin, which accumulates at its mouth in sandbanks; its course may be estimated at about 400 miles; but it is not navigable for more than seventy-five miles. The district of vineyards commences fifty miles east of its mouth.

Two small basins open to the sea to the north and south of that of the Duero; on the latter, the Mondego, which, rising in the northern extremity of the Sierra Estrella, in its upper course receiving numerous torrents, and flowing through a rugged and extremely difficult country, but navigable in its lower, through the plain of Biera, falls into the sea near the cape of the same name, after a course of 130 miles; between it and the Duero, the Vouga, a torrent with a course of sixty miles, falls into the Bay of Aveiro; on the former, *i.e.*, to the north of the Duero, the Cavado and other streams flow through a beautiful and very fertile country; and beyond, the Minho stretches its very irregular and remarkable basin, which, divided naturally in two parts by projecting spurs from north and south, presents above a country of mountains, and below one of plains. Of this river, the upper basin is again capable of division into the basin of the Upper Minho, on the south, and of the Till, its affluent on the north, surrounded on all sides by the spurs of the Western Pyrenees, which intersect the country in rugged sierras; the head waters of the former open communication with the valley of the Eyla, and of the latter with the sea coast, at the north-western angle of the Peninsula.

After the junction of its two sources, the Minho bursts through the mountain barriers, and issues in a small circular basin, from which again it seems to force a passage to the open and fertile plain below: it enters the sea about fifty miles north of the Duero, after a course of about 150 miles. To the north of the Minho is the unimportant torrent, the Ulla.

4 *The Rivers of the East.*—The rivers of the eastern coast of the Peninsula correspond to those of the western, except that the sources of the Xucar and Ebro cover those of three rivers, on the opposite slope, those of the Guadalaviar being overlapped by them. The most southern of these rivers, the Segura, rises in the northern slopes of the Sierra Sagra, and its valley is separated from that of the Guadalquivir by a sierra of the same name; it has a tortuous course of above 150 miles, and receives several affluents, among which may be named the Guadentin, Quipar, and Madera, from the right; and the Sangonera and Mundo from the left. The upper basin of this river is distinct in character from the lower, the former being a

mountainous desert region, the latter consisting of fertile plains through which numerous canals fed by its waters have been constructed.

Xucar, or Jucar, rises in the Sierra Cuenca and Sierra Alborracin from two principal sources, which flow in contracted parallel channels from north to south for about 100 miles, when the westernmost and principal stream bending eastward receives the waters of the Cabriel, by which name the other source is known. The easterly trending of this river is caused by the projecting terraces of the Sierra Almanza, which separate its valley from that of the Segura. The upper basin of the Xucar is not so well defined as those of other rivers in the Peninsula, blending with the eastern slopes of the central plateaux, but the course of the Cabriel is tortuous, and its basin more extended. The total course of this river cannot be much less than 200 miles; its lower course is like that of the Segura through rich plains, to which it supplies by canals the necessary means of irrigation. Near the mouth of the Xucar are the lagunes of Albufera, the largest of which is eleven miles long by four broad, and communicates with the sea by a narrow channel.

The Guadalaviar has its source in the eastern spurs of the Sierra Alborracin; its upper course is through deep gorges, its lower through fertile plains, but its valley is throughout contracted, and it has no affluents worthy of notice; its total length may be above 125 miles.

The Palencia is a small river between the Guadalaviar and Ebro.

The Ebro, the ancient Iberus, which gave name to the Peninsula, is, indeed, its most important river; its waters, with those of the Duero, almost unite the Mediterranean to the Atlantic, though not by any practicable channel, for its rocky bed and impetuous torrent entirely prevent its navigation; its very irregular and rugged basin we may divide into three parts. Rising like the Duero in the Sierra Reynosa, its course is barred to the south by the continuous heights of the Sierra Oca and Sierra Moncaya; its upper basin is contracted by the Sierra Oca and spurs of the Pyrenees, and is entered only by the defile of Pancorbo, but a few paces broad, and winding between precipitous rocks. The affluents received in this basin are mere mountain torrents, insignificant in size, yet many of them famous in story, and among them the Zadorra will not be forgotten. Below the second basin is more extended, opening to the north and south, and admitting the waters of the Xalon, or Jilon, which rises in the Sierra Alborracin, and with its confluent the Xiloca, or Jiloca, drains a considerable area, and has a course of about 100 miles from the right; and the Aragon, with its affluent the Arja, which has neither so large a basin nor so long a course, from the left; on which side also the Gallejo joins the main stream; and here the irregular spurs projecting from the Sierra Alborracin and Sierra Penagolosa obstruct its passage to the sea, and with those from the Pyrenees on the north, form a series of desiles, of which that of Las Armas is the most formidable. The Ebro also receives the Huerba, Almonacid, and Guadalupe from the right, and the Segré from the left. The Segré, the ancient Sicoris, descends from the Gorge la Perche, and itself a torrent, accumulates in its narrow and irregular channel the waters of several others; after the confluence of the Cinca, a river of the same character which joins it from the right, it becomes a considerable stream; its course may be 150 miles; it has its sources in the southern defiles of the most lofty and massive of the Pyrenees, and opens to the valley of the main stream by difficult passes.

The lower course of the Ebro is obstructed by the detritus brought down from its upper basins, and an extensive delta has been formed at its mouth; but although the navigation is thus impeded, it is secured by canals throughout two-thirds of its length, which may be nearly 350 miles.

Beyond the Ebro the Lobregat, a considerable stream, the Tordera Ter Fluvia, and Monza drain the transverse valleys formed by spurs from the Pyrenees, the angle between which and the Ebro is covered by them.

The eastern slope of the Peninsula differs from the western as presenting much less barren country in proportion to its area; the lower valleys of the rivers are of surpassing fertility.

## CHAPTER XVIII.

## THE RHONE VALLEY.

- § 1. The southern extension of the primary watershed.—2. The upper valley of the Rhone.—3. The Saone.—4. The lower course of the Rhone.—5. Rivers of the lower basin of the Rhone.

**THE Southern Extension of the Primary Watershed.**—From the western bastion, so to speak, of the central watershed of Europe, it has already (p. 314) been noticed, that an extension of the chain is found to the south and north, and here the most elevated summits were observed. The Pennine Alps stretch for 100 miles from Mont St. Gothard to Mont Blanc, (the culminating point of Europe, rising 15,810 feet above the level of the sea,) here thirty-four glaciers, extend over ninety-five square miles; the largest is the well-known Mer de Glace. Mont Rosa rises 15,208 feet and Mont Cervin between them, 14,850.

The principal passes of the Pennine chain are the Gorge of the Simplon, leading from the upper Rhone valley to the basin of the Lago Maggiore and the river Ticino, extending for thirty-eight miles at an elevation of 6592 feet below Mont Leone. The Great Saint Bernard, between the extended spurs of Mont Blanc and Mont Ceniz, affording access from the valley of the Dranse to the northern source of the Doria Baltea at an elevation of 8150 feet; as that of the Little Saint Bernard, to the south of Mont Blanc, does with the western sources of the same river at an elevation of 7076 feet; and they unite at the confluence of its sources in its upper basin.

Two important spurs stretch from Mont Blanc to the north and north-west; the one between the Dranse of the Valais and the Arve, limits the valley of the Rhone to the west, and changes its course nearly at right angles, this is a massy and rugged range, traversed by difficult gorges, and culminates in the Dent du Midi at 10,771 feet; it divides at its northern extremity and forms the basin of the Dranse of Savoy, extending towards the eastern and northern extremities of the Lake of Geneva: the other also dividing, extends on the north along the valley of the Arve to the Rhone, approaching the Jura from the opposite side, and on the south along that of the Isère, thus enclosing the valley of the Fier; the latter range is known as the Banges.

The Grecian Alps extend southward from Mont Blanc, forming a semi-circle round the sources of the Isère, of which the diameter is above forty miles from the Little St. Bernard to Mont Ceniz; they culminate in Mont Iséran at 13,275 feet, and from this as a centre, spurs diverge between the sources of the Isère on the west, and the affluents of the Po on the east; to the south the pass of Mont Ceniz separates them from the Cottian Alps. This is one of the most important passes of the western Alps, as giving access to the centre of the upper basin of the Po; its elevation above the sea is 6775 feet.

The Cottian Alps stretch in a south-easterly direction from the extreme western spurs of Mont Ceniz to Mont Viso, a distance of nearly forty miles. Mont Genevre culminates about the centre of the chain at about 11,800 feet; while Mont Viso, at the southern extremity, rises 12,585. The passes over this chain are those of Sainte Genevre, which connects the northern sources of the Drance with those of the Doria Repaire; it has an elevation of 6560 feet; and the Gorge d'Alvires, connecting the middle source of the Drance with the Clusone. The line of the Cottian Alps is extended to the north-west between the Arc and Romanche, stretching to the Isère; it culminates in Mont des Trois Ellions at 12,735 feet, while spurs of considerable importance are thrown off to the south-west, between the Drance, Drac and Durance. That between the Drome and Drac is most elevated, culminating at Mont Olan 13,819 feet, and Mont Pelvoux de Vallonise 13,450. That between the Drance

and Durance is less elevated, its highest point being Mont Ventous, which does not rise much above 6400 feet.

The maritime Alps extend from the Col d'Agnello, which separates them from the Cottian Alps, to the Gorge of Cadibon, where the chain of the Apennines commences, in a semicircular direction round the principal sources of the Po; the chord of the arc may be estimated at about sixty miles; they culminate on Mont Longet at an elevation of 10,350 feet; but the declension of the chain is very rapid towards the south and east. The passes are the Col d'Agnello, 10,650 feet above the sea, carried along the southern slopes of Mont Viso and connecting the Durance with the Vraita; the Gorge d'Argentiere and Col de Roburent, connecting the Durance with the Stura; the Col de Tende, connecting the southern source of the Stura with the Roya, which falls into the Mediterranean to the north of Monte Ceppo, the extremity of a southern spur from the centre of the maritime Alps, which approaches closely to the sea; this pass has an elevation of 5880 feet; the pass of Nava, 3150 feet in height, connecting the Aroschia and Tanaro; and the pass of Cadibon, 1608 feet only in elevation, which leads from the Gulf of Genoa to the valley of the Bormida. It may be questioned whether this chain should not be considered as extending to the pass of Bochetta, at the source of the Orba, or else as limited further westward at the Col de Tende, or the Col de Roburent; but custom, frequently the proper result of local knowledge, has determined otherwise.

2 *The Upper Valley of the Rhone.*—The valley of the Rhone divides naturally in three parts. The basin of the upper Rhone to the east, that of the Saone to the north, and of their united stream to the south; the former is one of the best known mountain valleys, and, it may be added, one of the most beautiful in the world, and at the same time one of the most sublime. Hemmed in between the Bernese Alps on the north and the Pennine chain on the south, this valley, the Valais, extends about ninety miles in length, and from fifteen to thirty in breadth.

The Rhone rises in the eastern extremity of the Valais, in the Rhone Glacier, between Mont Furka and Mont Grimsel, at an elevation of 5750 feet; its course is to the south and east for nearly seventy miles, and then trending suddenly round the base of the Gemmi, north and west, until it falls into the Lake of Geneva; at the angle thus formed its elevation is 1575 feet, showing a fall of nearly sixty feet to a mile. At this angle, the Dranse, an inconsiderable torrent, falls from the slopes of the Great St. Bernard into the main stream; and here the upper valley of the Rhone may be said to terminate, for its upper course is naturally susceptible of a threefold division.

As the first is the Valais, the second is principally occupied by the Lake of Geneva, Lake Leman, or Genfer-sec. This lake, of a lengthened crescent shape, extends in length from east to west forty-five miles, and in greatest breadth of its area is estimated as eighty square miles; it is 1230 feet above the sea; and its greatest depth, near its eastern extremity, is 985 feet. It is traversed by the Rhone, and receives the waters of above forty small streams. Of these, the more important are the Dranse, which has a course of twenty-four miles, and falls into the lake near the centre from the south, and the Venoge.

From the open basin of the lake, separated only by the low elevations of the Jorat from Lake Neuchatel, the Rhone, trending to the south, and closely pressed by spurs from the Alps and by the range of the Jura, flows with rapid stream through an irregular and rugged channel. It is these mountains which form as it were the buttresses which support the basin of Lake Leman from the west, and, after forcing its way through them, the river turns abruptly to the north-west, and then again south-west and west to its confluence with the Saone.

In this part of its course the affluents of the Rhone are the Arve, which has its source on Mont Blanc, at an elevation of 3658 feet. Its upper basin

is the valley of Chamouni ; it has a course of forty-two miles, is impetuous, and subject to inundations ; the Fier, and its confluent, the Cheran ; the former flows through the lake of Annecy, which is nine miles in length, two in extreme breadth, and 1242 feet above the sea ; from the junction of this stream, the Rhone is navigable ; the Bourguet, which traverses the lake of the same name, also called Chatillon, which is eleven miles in length and two in breadth, and noted for its beauty ; and the Guier, which descending from the Banges, flows through a difficult country. The valleys of all these streams radiate from Mont Blanc as a centre. On the right, the only affluent is the Ain, which, descending from the reverse slope of the Jura, flows at the base of that chain, which, rising to nearly 6000 feet above its left bank, presents rugged heights, down which torrents precipitate themselves into the river. On the right bank is an undulating table land, separating it from the Saone. This is not, strictly speaking, a navigable river, though for fifty miles its waters are made available, during the spring freshets.

3 *The Saone*.—This river, the secondary source of the Rhone, rises in the plat of Langres, and its basin communicates with those of the Rhine, Moselle, Seine, and Loire, between which it is situated, and the watersheds of which are common to it ; its source has an elevation of 1332 feet, its length about 225 miles, for 175 of which it is navigable ; its course is slow and placid, and in strong contrast to the turbulence of the Rhone. Flowing from north to south, at the base of the Côte d'Or and mountains of Charolais, the Saone has only rivulets for affluents on the right bank ; on the left it has several small, but only one important, affluent, viz., the Doubs, which rises in the Jura, at an elevation of 3123 feet. Its upper course is through a mountain valley, winding, rapid, and interrupted by cascades, one of which, at Morteau, has a fall of eighty-eight feet ; flowing at first from south to north, it turns abruptly, and assumes a southerly course to its junction with the Saone. Its length exceeds 200 miles ; it receives the waters of the Savoureuse from the gap of Belfort, at the point of junction between the basins of the Rhine and Rhone, of the Loire, and other smaller streams.

4 *The Lower Course of the Rhone*.—Below the junction of the Saone the Rhone receives some small affluents from the slopes of the Cevennes, the Doux, Eyrieux, Gier, and Ouveze ; the Ardeche, which is fifty miles in length, navigable for eight, and remarkable for its natural rock bridge at Pont de l'Arc ; and the Gard, or Gardon, the impetuosity of which in its upper course not unfrequently causes inundations in the lower.

The affluents of the left of the Rhone, in its lower basin, are the Isère, which falls from Mont Iséran, and receives one affluent from the Little St. Bernard pass, and another from the opening of the Rhone valley to the south-west ; its course through its upper basin, the Tarentaise, is north-west, but bending at a right angle, it assumes a south-west course to the junction of the Romanche, from whence its course is westerly to the Rhone. The Arc is the principal affluent of the Isère, it also has its rise in Mont Iséran, and flows at the base of Mont Cenis, in a parallel course ; it may, perhaps, be rather esteemed a confluent ; its length is forty miles, if considered an affluent. The entire length of the Isère may be estimated at 150. The Drac and Romanche, two torrents, unite their waters, which rush, swollen by numerous other mountain streams, through the deep ravines of the spurs thrown out at the junction of the Cottian and Grecian Alps. They may both be about forty miles in length. The Drance has a course of sixty miles, but is not navigable.

The Sorgues rises in the Vaucluse fountain in Mont Ventoux, which has an elevation of 6250 feet, receives the Ouveze and Nesque, and differs so much from the preceding affluents, that it is navigable throughout its entire length of twenty miles ; it enters the Rhone by two mouths. The Durance, a more important affluent, drains the whole western slope of the Cottian Alps, its northern source being to the north of Mont Genevre, and its southern in the south-western spurs of Mont Viso. Its two northern sources are the torrents Guizanne and Clairet, which unite at an elevation of 4250 feet above



the sea. From hence its course is south-west, and then due south. At the junction of the Buech, the elevation above the sea is 1572 feet, and from thence its course is from east to west. Here its bed is wide, shifting, and shallow, obstructed by sandbanks, but to a certain extent navigable for above 100 miles: its entire course is above 150. Its principal affluents are the Guil, from the pass of Abries, which has its course through a frightful gorge; the Ubaye, which has its source in Mont Viso, and flows through the valley of Barcelonnette, at an elevation of 3800 feet; and the Verdon, which has a course of 100 miles.

From the junction of the Saone, the course of the Rhone is from north to south; it becomes a deep and rapid stream, 1500 feet in breadth. Below the junction of the Durance, the river divides into two branches, flowing south-west and south-east; the latter is the Great Rhone. These again subdivide; the former into the Little Rhone and the Dead Rhone, the latter into the Old Rhone and Great Rhone. The island enclosed between these two branches is called La Camargue; it is deltoid, of triangular shape, twenty-six miles long by eleven in main breadth, of extreme fertility, and producing from its marshes salt, naturally, in large quantities. The fall of the Rhone, as compared with its length, is greater than that of either of the other primary rivers of Europe. In direct distance, its length is 285 miles; the extreme length 650, of which it is navigable 325 miles.

5 *Rivers of the Lower Basin of the Rhone.*—Some small rivers occupy the extension of the lower basin of the Rhone, to the east. The Arc, the Argen, which is navigable for nearly forty miles; the Var, a rapid, turbulent, formidable stream, subject to terrible inundations, rises in Monte Cameleone, and, with a course of sixty-five miles, falls into the Mediterranean. It is 2500 feet wide at the mouth; and the Roya, which descends from the Col de Tende; its connexion, as well as the other rivers to the east, is with the valley of the Po.

To the west of the Rhone: of these the Vistre, Lez, and Hérault flow from the Cevennes, the former being connected with the Little Rhone. The Aude, Gly, Tet, and Tech, rise in the spurs of the Pyrenees. The former has a course of 125 miles, receives many small streams, and falls into the lagunes of Sigean and Agde. The three latter are mountain torrents, but the plains at their mouths are level and marshy, and through them are spread a network of canals, both natural and artificial. They have courses respectively of forty-five, sixty-five, and forty-five miles.

## CHAPTER XIX.

### THE VALLEY OF THE PO AND ITS RIVERS.

§ 1. The Apennines.—2. The upper course of the Po.—3. The middle course of the Po and the Lake District.—4. The southern spurs of the primary watershed.—5. The lower course and delta of the Po.—6. The rivers of the extension of the basin of the Po.

**THE Apennines.**—This chain of mountains, opposed to the Pennine chain, from which it is distant about 100 miles, naturally divides into two parts; that which with a general easterly trending forms the northern limit of the Gulf of Genoa, and that which from the source of the Magra assumes a southerly direction, which is maintained throughout the whole peninsula of Italy.

The Gorge of Cadibon, at the sources of the Bormida, has already been stated as the point from which customarily the Apennines are said to have their commencement, being separated by it from the maritime Alps, as already noticed, p. 338; these, however, seem rather a continuation of the Apennines than of the Alps, or, if appertaining to the latter, then the chain of the former

would more naturally commence at the Bochetta Pass to the north of the Bay of Genoa. From the Gorge of Cadibon to Mont Orsaro in Carrara, may be seventy-five miles. In this portion of their course the Apennines send out short spurs to the north and south, the former melting away insensibly into the plain, the latter presenting buttress-like formations to the sea, with a mean elevation of 5000 feet: these mountains are comparatively barren, their valleys, perpendicular to the main axis, are not of great extent; they are passed by the Gorge of Bochetta, 2549 feet above the sea, already noticed; that of Monteburno opening the valley of the Trebbia to the shores of the Gulf; and of Pontremoli, connecting the sources of the Magra and Tara; while the road of the Corniche carried along the shores of the Gulf, and terminating at the pass of Bochetta, opens communication with the lower valley of the Rhone.

From the sources of the Mara to those of the Tiber, the Apennines have a south-easterly trending for about 100 miles, and here they have greater solidity, and attain their northern extreme culmination in Mont Cimone at 6976 feet above the sea; within this distance there are the gorges of Mont Cimone; from the valley of the Serchio to that of the Secchia that of Fiumalbo; from the middle course of the Arno with the Panaso, and of Pietra Mala between the northern source of the Arno and the valleys of the Idice and Savena; this is the principal road from the valley of the Po into the peninsula, and has an elevation of 3294 feet.

The more southerly course of the Apennines is through the peninsula for above 350 miles, from whence, trending westward, they pass into Sicily; they attain their greatest breadth near the centre, about the head waters of the Siben, where they culminate in Mont Corno, 10,154 feet above the level of the sea: while Mont Majello, an out-lying peak near the eastern coast, rises 9130 feet.

The structure of this chain is for the most part calcareous, though limestone predominates at the extreme north, and primary rocks at either extremity in Piedmont and in Calabria; limestone also forms some of the more beautiful valleys of the central portion of the chain: it is poor in minerals; its most remarkable productions being the marble of Carrara on the north, and the saline deposits of Cosenza on the south: extinct volcanoes present themselves in many places, especially on the north, at Volturno; to the south, is the only active volcano on the continent of Europe, Vesuvius.

The Apennines do not exceed the level of perpetual snow, though the head of Mont Corno is only bare in summer; their summits are for the most part bare and rugged; below 3200 feet their sides are covered with luxuriant semi-tropical vegetation—orange, citron, olives, and palm trees: perhaps the main feature of the chain may be justly considered its continuity.

2 *The Upper Course of the Po.*—This river, the Padus or Eridanus of the ancients, rises in the eastern precipices of Mont Viso, at an elevation of above 6500 feet, in immediate proximity to the sources of the Durance, and flowing first to the south and by east to north, and then again by east to south, takes a double course formed by two semi-circular arcs, having diameters of about seventy-five miles, and giving to the upper basins of the Po a length of about 125 miles; while its breadth, from the sources of the Dora Baltea on the north to those of the Bormida on the south, will exceed 150.

The steepness of the southern and eastern slopes of the Alps gives great rapidity to the upper waters of the Po and its northern affluents, and therefore, on arriving at the level plain at the foot, they are subject to serious inundations; the course of the river becomes tortuous, its stream sluggish, obstructed by shoals and sand-banks, and forming numerous channels; this character becomes apparent even in its upper basin, at the eastern extremity of which the river attains a breadth of about 1500 feet.

The affluents of the upper basin are on the right: the Vraita, the Maira, and the Grana, which uniting together, fall into the main stream; the former rises in Col d'Agello, and opens a passage into France. These are separated

from the Tanaro, the next affluent of the river from the right, by the heights of Montferrat, which, projecting from the maritime Alps, obtrude themselves on the course of the Po and turn it northward, as already noticed, and fill the second semi-circular arc; and while the Tanaro collects the streams which fall from the southern slope, the main stream flowing round those to the north does not receive any affluent from them.

The Tanaro passes along the diameter of the semi-circle above alluded to, in an irregular north-east course. This is a considerable stream, rising in the Col de Tende, and having a course of 125 miles, for forty of which it is navigable: it has several affluents, some of which are considerable; on the left the Eleno and the Sterra, and on the right the Bormida, formed by the confluence of two streams of the same name, and the Orba. The basin of the Tanaro wears the aspect of an elevated plain intersected with deep valleys.

The Scrivia and Coppo traverse a fertile country, and fall into the Po on the limit of its upper basin. The affluents of the left arc, the Clusone, which rises in Mont Genevre, and, receiving one affluent from the pass of Abries, falls into the main stream after a course of about fifty miles.

The Doria Riparia, also rising in Mont Genevre and connecting the passes of that mountain with those of Mont Cenis at the Pas de Susa, it is divided from the Doria Baltea by the smaller affluents, Stura and Orea.

The Doria Baltea rises from two sources in Mont Blanc, and which open the passes of the Great and Little St. Bernard, communicating with the upper valleys of the Rhone and Isère: it receives numerous torrents, and has a rapid course over a deep and rocky bed.

The Seria, which has its sources in the southern declivities of Mont Rosa; it is a stream of considerable size, but unimportant, as not opening communication across the Alps; it receives the Cervio from the right. The upper course of this river is through a wild mountain valley, its lower through a flat country, through which it forms anabranches, and is connected with the other affluents on the right and left by canals; its extreme length may be estimated at eighty-five miles: it is the stream intermediate in character as in position between the upper and middle basins of the Po.

3 *The Middle Course of the Po and the Lake District.*—Projecting spurs and terraces from the Apennines approaching the banks of the river in its middle course, throw off streams from their flanks to the east and west, of these the Curona, the Staffora, and the Fidone are the principal, they are deep, turbulent, and rapid, and flow through a fertile but broken country.

The Trebbia has its rise in the angle formed by the easternmost of these spurs and the main chain in the gorge of Monte Bruno; it has numerous affluent streams, divides in several channels, extends to a mile in width, but is everywhere fordable, and often dry in summer; its inundations, however, make serious inroads on the country through which it flows; its length exceeds fifty miles.

The Taro rises in the pass of Pontremoli. The Crostolo and the Secchia, rising on the mountains of Carrara, unite in their lower courses by numerous anastomosing branches: the latter has a course of seventy miles.

The middle course of the Po may be estimated in direct distance as about eighty miles, and here the southerly trending of the Apennines opens extensive plains to the south and east; on the north, the character of the valley is very different, projecting spurs of the Alps enclosing the middle basin of the river on the east, and forming long narrow valleys, for the most part occupied by lakes famous for their beauty. The first important affluent on the left is the Ticino, or Tessino, the ancient Ticinus, which, rising from two sources in Mont St. Gothard and the Splügen, connect with those of the Rhine and the Aar: their united waters fall into the Lago Maggiore, which receives also several other streams, of which the most important is the Toccia, from the pass of the Simplon. The Tresa on the left brings to it the surplus waters of the Lake of Lugano. This lake, situated nearly 200 feet above Lake Maggiore, is of a very irregular shape, stretching its arms to the north-west and south-

east among lofty, abrupt, but well-wooded precipices, by which it is enclosed; it is of great depth; its length may be estimated at sixteen miles, and its average breadth at two.

Lago Maggiore, the Lake of Locarno, the Verbanus of the ancients, as it is one of the largest, as its name implies, so it is one of the most beautiful in Italy, not less so from the character of its shores than from its islands: its length is forty miles and its average breadth two; it divides into two arms at the southern extremity; its depth is estimated at 300 fathoms in some places, and it is 700 feet above the level of the sea.

On leaving the lake the Ticino becomes navigable, flows through a level, fertile country, divides in branches, and forms many islands, and after a course of 125 miles its deep, broad, and rapid stream joins that of the Po.

In the southern watershed of the basin of Lake Lugano, the Olona and Lambro, two large rivulets, have their rise, become confluent in the valley, and again united by numerous anastomosing branches, at length join the main stream; the numerous channels thus formed make the country between the Ticino and Adda extremely difficult.

The Adda, the next important affluent of the Po from the left, has its sources in the Ortler Spitz, and in closer connexion with those of the Inn and Adige: in its upper course it flows through the Valteline, a valley fifty miles in length, by from four to twenty in breadth, opening to the south and west, and which affords communication between the Tyrol and the central plains of Italy. The Adda enters Lake Como about ten miles from the mouth of the Maira at its northern extremity, which flows from Mount Maloia; in its valley the roads from the Maloia and Splügen unite.

The Lake of Como is in length, nearly fifty, but in extreme breadth only eight; to the south it divides into two long arms stretching to the south-east and south-west, the former continuing the course of the Adda, the latter obstructed by the mountain from which the Lambro takes its rise; these, separated by the mountainous promontory of Bellagio, are about fifteen miles in length; its waters are of great depth, and it is subject to violent storms. The south-east branch is called the Lake of Lecco, and from it the Adda debouches in the valley, and about fifteen miles lower down receives from the left the Breno, a torrent from the southern slopes of the mountains of the Valteline; and in its lower course the Seria, also from the left, having its rise in the same watershed.

The Adda is a very deep and rapid stream; its right bank is open, but the spurs from the mountains encroach on the left; its length may be estimated at 100 miles, exclusive of the lake.

The unbroken chains of mountains which form the southern boundary of the lakes are crossed but by one road, that from the western arm of Como and Lake Lugano; and the parallelogram formed by these with the rivers Ticino, Adda, and the main stream of the Po, is the central and most important portion of the valley of that river.

As between the Ticino and the Adda, so between the Adda and the Adige, the affluents of the main stream fall from the southern watershed of the upper valleys of those rivers, they having, as has been noticed, their sources in immediate proximity. Of these the Oglio is the most considerable; it descends from Mont Tonal, flows through the wild and rugged Val Canonica, opening from the gorge of Apriga, it then traverses Lake Isco, which is fifteen miles long by two broad and above 900 feet deep, its shores are highly picturesque, and in most parts extremely fertile. In its lower course the Oglio flows parallel to the main stream; here it receives a considerable affluent, the Mella, which flows through Val Trompia, and lower down a still more important affluent, the Chiese Clusio, which, rising in the southern spurs of Mont Adamiello, flows through Val Sabbia, and traverses Lake Idro. The Val Sabbia is a dangerous defile, and opens on the lake, which is only seven miles long by two broad, yet 400 feet deep. The Chiese has a course of seventy-five miles.

4 *The Southern Spurs of the Primary Watershed.*—From the Chiese, the character of the northern watershed of the Po alters entirely, no longer rising precipitously from the level plain, but extending into and intersecting it by bold and elevated spurs. The first of these extends between the Adda and Adige, stretching to the south from the Ortler Spitz. This may be considered the south-eastern extension of the bastion which supports the eastern extremity of the central watershed, and which, though less clearly defined than that on the western, is still sufficiently well marked.

The southern spurs, culminating in the Gavio and Tonal, at an elevation respectively of 11,750 and 10,975 feet, extend westward along the Valteline and Lake Lecco, and culminate in Mont Tresero, 11,820 feet above the sea; here is the pass of Apriga, already noticed. The majestic wall of the Tonal, to the east, with its impassable rocks and glaciers, is turned, by the recently constructed road over the Stelvio Pass, over the southern extremity of Mount Ortler, connecting the upper valleys of the Adda and Adige at an elevation of upwards of 9000 feet; and a mountain path over the Tonal has been also converted into a passable road, and another pass extends westward to the basin of Lake Idro.

To the east of this remarkable chain lies the upper valley of the Adige, shut in by another chain of equal importance, though not of as great elevation, on the opposite side. This commencing in the Noric Alps, between the sources of the Eysach and Drave, is known as the Cadoric Alps, having a mean elevation of nearly 6000 feet; it culminates in Mont Marmolata, at 10,500 feet, and Cunà d'Arta, 9200, and terminating in Mont Moregno, having an elevation of 6500 feet. Two spurs are thrown off from the chain enclosing the sources of the Drave and Brenta; through the latter, the frightful defile of Sugana uniting the valley of the Brenta with that of the Adige.

The Mincio and Lake of Garda, the Benacus of the ancients, may be considered as intermediate between the middle and lower basins of the Po, and assimilates in character to both. Rising in the southern slopes of the Tonal, under the name Sarca, it falls through a very wild valley into the lake, which is near forty miles long by ten in extreme breadth, and near 1000 in depth, enclosed by mountains, excepting on the south, where the promontory of Sermio extends into it. It is still less irregular in shape than any other of the Italian lakes; it is only 230 feet above the level of the sea. In its middle course, the Mincio forms the three marshy lakes of Mantua, and encircles between its branches and a canal the island called the Seraglio. The Mincio, though of little breadth, is rapid, and being used for the purposes of irrigation, can be rendered deep enough either for navigation or defence. It is commonly navigable from Mantua, and has a course of about forty miles. The eastern shores of the lake are only five miles from the Adige, which, in its middle course, runs parallel throughout the whole length of the lake.

5 *The Lower Course and Delta of the Po.*—Sending out numerous branches, and constantly ravaging its course, unless where confined by earthworks, the Po, in its lower course, forms a network of channels, surrounding islands and connected by canals, both natural and artificial, too intricate for description. Three main channels, however, separate from each other about half-way between the Mincio and the sea. That to the north, termed Po della Maestra, forms several mouths, the principal of which are Delle Telle and Di Goro, the latter of which approaches closely to the mouth of the central channel, the Po de Volans, which in its upper course is connected with the lower course of the Po de Goro by the Canal Bianco. The southern channel, called the Po de Primero, stretches far to the south, and receives the waters of numerous small streams which flow from the northern face of the Apennines.

At the point of divergence of these channels, the river is nearly 4000 feet in breadth, and from thence it flows through troughs, partly natural partly

artificial, raised high above the surrounding country ; more than sixty feet near Ferrara, where the river is on a level with the towers of the city. This district is, in short, one vast alluvial deposit, which has, since historical times, extended many miles into the Adriatic ; few rivers have, for their size, so extensive a delta ; the rapid increase of the land on the sea has been estimated at above 200 feet yearly. The formation of new channels for the waters of the river, and the accumulation of deposit at their mouths, have contributed to render what formerly were the more important channels now useless ; this is the case with the Volano and Primaro, which now surround vast marshy lagunes, separated from the sea by a slight embankment of sand which its waves have heaped up ; the double action of the river and the sea has formed banks and shoals stretching above thirty-five miles from north to south, and about twenty-five from east to west ; these will, no doubt, within some no very lengthy period of time, increase to islands, and limit the mouths of the river, as has happened with similar shoals, recorded by the ancients, at the mouth of the Danube.

The only affluents of the lower course on the right, worthy of mention, are the Panaro and Reno ; the former, also called Scultenna, rises in Monte Cimone, and is joined by canals with the Secchia and Reno, it is navigable for a considerable part of its course of seventy-five miles ; the latter, rising in the eastern spurs of the same mountain, receives several tributary streams : its course has been directed into a canal, called the Benedictine Fosse, by which its waters are carried into the Po de Primaro, which is by some considered as a natural extension of its channel ; but in this country, where man has been fighting for ages to preserve the land from the inundations of the river, that which is partly natural and that which is altogether artificial cannot easily be distinguished, nor is historical knowledge of the ancient channels to be expected when the country is so entirely intersected, and where, but for the interference of man, they must be constantly changing.

The Reno has a course of seventy-five miles, but is only navigable for twenty-five. The other affluents on the right are, as already noticed, insignificant, though numerous. On the left there is but one, the river Tartaro ; the stream of the Adige intercepting the waters which flow from the southern face of the Alps.

The entire course of the river may be estimated at about 350 miles, for 280 of which it is navigable for barges and steamers.

6 *Rivers of the Extension of the Basin of the Po.*—Between the southern mouth of the Po and the promontory of Ancona, more than ten considerable streams fall from the Apennines into the Adriatic. The nearest to the affluents of the great river is the Lamone, which has a course of fifty miles, as has the Ronco, at the mouth of which more than two miles of ground have been added to the coast. The Metauro is of about the same magnitude. On the north, however, the rivers of the extension of the valley of the Po are far larger and more important. Of these, the first and principal is the Adige, which seems at first sight intended for an affluent of that river.

The upper course of the Adige, or more properly the Etsch, is through the triangular valley, or congeries of valleys, extending from the sources of the Drave to the Inn, about seventy-five miles, and from the main sources of the river to the debouché, into the valley of the Po ; it rises in the southern face of the gorge of Rescha, and its upper valley communicates with the gorge of Tschirf and with the Stelvio Pass ; its upper course is south-east, east, and north-east, but suddenly bending at a right angle, it assumes a south-easterly direction to its confluence with the Eysach, where it has the name Adige, and whence it takes the south-westerly trending of that stream throughout the remainder of its course among the mountains. The Eysach is in some respects the more important source of the Adige ; it descends from the gorge of the Brenner, and, receiving the Rienz from the gorge of Toblach, unites with the Etsch to form the Adige. The confluence of these streams is at the junction of the passes from the Valteline, the Tyrol, and Styria.

Before this junction the bed of the Eysach is 2024 feet above the level of the sea; from this point the stream becomes navigable, has a sinuous course, encloses many islands, flowing between low banks until it receives the Nos from the right, the valley of which opens communication across the Tonal; here the banks become steeper and the stream more rapid, and it receives the Lavis from the left; and a pass opens to the source of the Brenta. The Adige, pressed in by mountains, flows in its middle course through a narrow valley, winds round the base of Mount Baldo, and enters the plains of Lombardy in a broad, deep, and rapid stream: it now bends to the east, round the base of the extended spurs of the Alps, having on its right bank a district of marshes and rice fields, which reach as far as the Mincio; in its lower course it forms numerous channels, and, like the Po, finds its way to the sea with difficulty; it is connected by canals with that river, and has a course of 220 miles.

The Bacchiglione rises in the heights which form the southern limit of the upper valley of the Adige: it has a course, generally south-east, of about fifty-five miles, at first through a bold and well-defined country, but afterwards, like its fellows, through swamps and marshes, and loses itself in the Venetian lagunes.

The Brenta rises in the mountain gorges to the east of the Adige: in its upper course it flows through Lake Lerico and the Val Sugana, and then descending in the plain, creeps tortuously to the lagunes; much of its lower channel is maintained artificially; its original course apparently having been towards the Bacchiglione, with which it is still connected; its present mouth is called Brenta Magra; it is navigable throughout its lower course, and its entire length is near 100 miles.

The lagunes at the mouths of these rivers extend for above twenty-five miles, with an average breadth of five: they are very shallow, separated from the sea by numerous islands, forming almost a continuous causeway or embankment, which, from the mouth of the Piave, stretches to the south-west for seven miles; this river, rising in the Carnic Alps, to the south of the gorge of Toblach, from two sources, flows in a wide and shallow bed in its upper course, between the spurs from the mountains; in its lower, through marshes; it has one affluent in its upper course, the Cordevole, and one in its lower, the Sile, both from the right.

The Livenza, the Tagliamento, and the Isonzo, ought perhaps rather to be considered as occupying the upper part of the basin of the Adriatic, than as belonging to the extension of the valley of the Po, but their importance is scarcely sufficient to justify any prominence in noticing them: it may be sufficient to say that the two former rise in the Carnic Alps; of these, the Tagliamento is the larger, having a course of 100 miles, but it is only navigable for ten: both have irregular courses among marshes from many channels, and issue in lagunes.

The Isonzo rises in the southern slopes of Mount Terglou, and flows in a tortuous course through deep defiles and amidst lofty mountains; it receives several affluents; the Idria, famous for its mines of quicksilver; the Wippach, descending from the gorge of Adelsberg, both on the left; and on the right the Torre, which, with its affluent the Natisone, joins the Judri, and their united streams flow into the Isonzo in its lower course. This river is broad, deep and rapid, and forms a natural limit between Italy and Istria; some small streams occupy the space between it and the Tagliamento; these three rivers have considerable deltas, and the coast is lined with lagunes and covered with islands.

## CHAPTER XX.

## PENINSULAR ITALY.

- § 1. The watersheds.—2. The rivers of the west.—3. The rivers of the east.—  
4. The lakes.

**THE Watersheds.**—The chain of the Apennines leaving the basin of the Po, passes through peninsular Italy, and culminating near the centre, divides towards the south in two chains, forming the cincture of the gulf of Otranto and of the basin of its tributary streams; and stretching southward in the peninsula of Calabria, and eastward in the promontory of Otranto. At the point of separation of these chains, the head waters of the Tanagro on the west, of the Ofanto on the east, and of the Bradano and Vaseuto on the south, are in close proximity; numerous spurs are thrown off to the east and west, the principal of which forms the watershed between the Arno and Tiber; detached elevations are also frequent, of these the best known is Vesuvius, a volcanic cone rising 3950 feet above the sea, and extending, with its inferior cone, Mount Somma, in an arc of eight miles; this latter is a precipitous mass of porphyry and tufa, the principal elevation being composed almost entirely of lava and scorise; the crater has a diameter of above 1500 feet, and is 500 feet deep; forty-nine eruptions have been recorded from this mountain since the year 79.—(See *Phys. Geo.* page 273.)

The Apennines divide the peninsula unequally to the north, affording space on the western slope for considerable rivers, while on the east torrents leap abruptly into the Adriatic; but on the south, having Mount Vulture, the point of divergence of the two chains, exactly midway between the two seas; the eastern slope is therefore, for the most part, extremely irregular in its contour, wild, rugged, and unproductive; the western no less famed for its beauty than its fertility.

**2 The Rivers of the West.**—Of these the first is the Magra, which after a course of thirty-five miles falls into the sea to the east of the gulf of Spezzia; next the Serchio, with a course of fifty-five miles, and then the Arno, rising in the south near the sources of the Tiber, which flows at first in an opposite direction; both in their lower courses flow to the west, and thus inclose an area of about 140 miles long by sixty broad, better known, perhaps, and more important in the world's history than any portion of the world's surface of equal size.

Like the other rivers of Italy already noticed, the Arno, in its upper course extremely rapid, has its lower course without sufficient fall, is therefore subject to inundations, and has its waters regulated by canals and embankments.

The Arno rises in Mount Falterona, at an elevation of 4444 feet; it has several affluents; of these are the Sieve, Pesa, Elsa, and Era. The Chiana emerging from the ancient marshes of the same name, is by some considered a bifurcation, but it is rather an affluent, as the stream of the same name to the south is of the Paglia, by which it joins the Tiber.

The entire course of the Arno may be estimated at 150 miles; it is navigable throughout nearly the entire length of its western course; its principal junction with the sea is effected by an artificial channel.

The district between the Arno and Tiber is drained by several streams; the Cecina, Ombrone, Albegna, Fiore, Marta, and Arone; of these the Ombrone is the principal, having a course of seventy-five miles; of this river the Orcia is affluent. The length of the others is less than fifty miles, but the Marta is of importance as carrying off the surplus waters of Lake Bolsena, which is ten miles long by eight broad, and lies among richly-wooded hills; in it are three small islands. The Arone, a small stream, carries off the surplus



waters of lake Bracciano, which has a circumference of twenty-two miles. To the north of the Ombrone is the lagune of Castiglioni, which receives the waters of several small streams; it is about ten miles in length.

The Tevere, Tiber, or Tibris, rises in Monte Comari, to the east of the sources of the Arno, and flows with a southerly course for nearly 150 miles before it trends to the westward; it joins the sea by two mouths, enclosing a small deltaic island, the *Insula Sacra* of the Romans. In the spring its stream is rapid, and turbid with yellow deposit from the mountains: as already noticed, it is connected with the Arno by its affluent the Chiana; its principal affluents are the Topino, Nera and Teverone from the left, and the Nestoro and Nepi from the right. Of these, the Nera has a course of sixty miles, and is noted for its beautiful cascade at Marmora above Terni; the Tiber is navigable when its stream is full to the confluence of the Nura. The Teverone, or Anio, has a course of about fifty miles; this river supplied ancient Rome with water. At Tivoli the Teverone forms a beautiful cascade of eighty feet in height. The Tiber is said to receive the waters of above forty affluent streams. The country on the coast, between the Arno and Tiber, is called the *Maremma*; it is an extensive plain, continued to the south in the *Campagna* of Rome and the Pontine marshes, and having an extent of above 200 miles; of this, the northern portion, the *Maremma*, has in many places become sterile from neglect; efforts have, however, lately been made, with success, to drain it; that to the south, the *Campagna*, is of extraordinary fertility, but like the *Maremma*, and even more severely, its inhabitants suffer from the terrible malaria. This disease, now so fatal, does not appear to have severely touched the inhabitants of those districts when they were well cultivated and populous. Of undulating surface, drained by numerous small streams, and producing spontaneous vegetation, the *Campagna* wants only an industrious population to restore it, in process of time, to its former condition; it is at present used mostly for pasturage. The Pontine marshes are about twenty-five miles long by ten broad: they can now scarcely be called by that name with propriety, except in the more northern portions, the canals, now nearly completed, having sufficiently effected their drainage. Like the *Campagna*, they are used principally for pasturage. The general slope being eastward, the lowest portion of the district is inland, and from it the mountains rise suddenly: these form the southern watershed of the upper waters of the *Garrigliano*, which, like the Tiber, to which its sources have close proximity, has a south-easterly course. This river, the ancient *Liris*, has a course of seventy-five miles, and receives the waters of the *Cora* and *Saceo* united from the right, and of the *Melfa* and *Rapido* from the left.

The next important stream is the *Volturno*, which has a course of nearly 100 miles, and receives several affluents, the principal of which is the *Calore* from the south, which receives also the *Tamara* from the right and the *Sabbato* from the left.

To the south of the *Volturno* is the ancient *Campagna Felix*, stretching in a level tract for forty miles in length by twenty in breadth, varied only by the cone of *Vesuvius* and the low, undulating ridges which stretch towards *Cape Miseno*; it is of undiminished fertility in corn and wine.

The streams which fall from the southern slope of the watershed of peninsular Italy are little more than torrents, and frequently dry in summer; they are the *Crati*, which with other streams drains the forest of *Sila*, the *Sinno*, *Agri*, *Salandretta*, *Vasento*, and *Bradone*; the country through which they flow is irregular and rugged, producing little but pasturage.

3 *The Rivers of the East.*—The shortness and irregularity of the eastern slope of the peninsula confines the streams which drain it to small areas; of these the *Ofanto*, the ancient *Aufidio*, on the south, has a course of seventy-five miles, and the *Candelaro* of forty-five; the latter has at its mouth a considerable lagune and important salt works.

To the north of *Cape Gargarno* the *Biferno* is important, as opening direct communication between the Bay of *Naples* and the *Adriatic*; its

length may be about forty-five miles. The Pescara and its confluent the Aterno have their sources north-west and south-east, at about fifty miles apart, between the head waters of the Tiber and Carrigliano, and flowing in opposite directions, have, after their confluence, a course at right angles to their upper courses; the length of the united stream is about thirty miles. This river is important, as affording communication with the Velino by the gorge of Androcco, which is again connected with that of the Carrigliano by the gorge of the Tagliacozza. There are also the Vomano, Tronto, and Chienti.

4 *The Lakes*—The peninsula of Italy has lakes contained in their own basins, and having no outlet; hence their valleys have become the more important in history as centres of communication; of these, the lakes of Perugia, the ancient Trasimenus, and that of Fucino, are the most important; the former especially, from its proximity to the head waters of the Tiber and Arno; it has a circumference of thirty miles, has three islands, and is surrounded by hills covered with forests of oak and chesnut; the latter is between the sources of the Aterno and Carrigliano, and is ten miles in length.

## CHAPTER XXI.

### GREECE.

- § 1. The watersheds of the north.—2. The rivers of the west.—3. The rivers of the east.—  
4. The isthmus and the Morea.

**T**HE *Watersheds of the North*.—Greece may be described as a massy promontorial extension from the primary watershed of Europe, terminating in a peninsula of corresponding magnitude; formed by the projection of numerous and irregular spurs, its coasts are deeply indented, and the lines of its capes and promontories carried onward into the sea in numerous islands; from Mount Kernitz, the point of junction with the Italian Alps, its western extremity, and the mouth of the Bosphorus, its eastern, the distance may be estimated at 650 miles; while a perpendicular line drawn from this base to the southern extremity, Cape Matapan, would be 375 miles in length.

The western extensions of the primary watershed from Mount Kernitz to the Black Sea, has been already described (p. 286); it remains to notice the spurs projected to the south which form the watersheds of Greece Proper. From Mount Scardo an unbroken chain of mountains, called Agrafo, the ancient Pindus, which culminates 8950 feet above the sea on Mount Mezzoro, and Tymphrestus stretches to the entrance of the Corinthian Gulf, of which it forms the limit to the north, the ancient Antirrhium. About seventy-five miles to the south of Mount Scardo there is another knot, Mount Zigos, from whence spurs are thrown out to the east and west, forming the ancient Cambunian mountains, on the west extending to the Acroceraunian promontory near Cape Linguetta, and on the east to the coast chain which forms the limit to the plains of Thessaly towards the sea, and which extend round the Gulf of Volo, marked by the culminations, Olymbo, Kissevo, and Zagoro, the ancient Olympus, Ossa, and Pelion, the former rising 9750 feet above the sea. From Mount Zigos the chain extends southward for about the same distance to the ancient Othrys, Mount Hellovo and Varibovo, which stretches eastward to the shores of the Gulf of Volo, and culminates in Geraco or Gura Vouno, 5570 feet above the sea, and all but meets the western extension of Pelion, Mount Bordzoia, the ancient Tisæus. Parallel to this, Mount Aninos, the ancient Ceta, culminating in Katabothra and Aninus, which have both an elevation of more than 7000 feet, extends from Tymphrestus, forming

the southern watershed of the valley of the gulf of Molo, which extends into the channel of Talanda, the ancient Eubœan Sea; and nearly parallel to this again, but with a more southerly trending, Lyakoura, Paleo Vouno or Zagora, and Elatea, the ancient Parnassus, Helicon and Cithæron, rising respectively 8000, 5000, and 4600 feet above the sea, form the watersheds of the south-east, and the promontorial extension of Cape Colonna, the ancient Sunium; while from the latter those spurs extend which connect by the isthmus the mainland with the Peloponnesus. From Mount Zigos two spurs extend to the west and south; the one nearly parallel to Pindus, forming the eastern watershed of the valley of the Gulf of Arta, the ancient Ambracia; the other more irregular, trending north and south, and broken into several smaller spurs, which stretch towards the northern shore of the gulf of Arta and the coast opposite Corfu, the ancient Coreyra.

The eastern range is remarkable for its continuity and solidity; it must approach closely 10,000 feet in its culminating point, but has much less average elevation; it is but little known; the defiles by which it is crossed are, one leading from the Drin to the Vardar, immediately to the south of Mount Zigos; another from lake Ochrida, at the southern sources of the Drin to the southern sources of the Vardar; a third connecting the valleys of the Beratino and the Nazilitza; a fourth a little lower down.

2 *The Rivers of the West.*—On the north and west the mountains approach so closely to the sea that there are no rivers; but the valleys are occupied by the sea, and the mountains are prolonged in islands, which cover the coast for about 120 miles south of the peninsula of Istria. The first river worthy of notice appears to be the Kerka; this has a course of sixty miles, and two affluents, the Knin and Dernis; it has considerable falls, but below them is navigable for large coasting vessels. Below this, Cape della Plances forms a corresponding projection to the peninsula of Istria, and below this again islands extend almost to the gulf of Cattaro, notwithstanding we find here a considerable river, the Narenta, having a course of at least 150 miles: here also is the Trebintitza, which flows parallel to the coast, but has no outlet. Below the gulf of Cattaro we find the Bajana, which, rising in lake Plava in the Missava mountains, has a course of about sixty miles, in which it forms the lake Scodra, or Scutari; it has a considerable affluent, the Moracca, from the right. The Drin, which rises from two sources, as already noticed, about 120 miles apart, known as the White and Black Drin, the latter flows from lake Ochrida, which lies between lofty mountains, and is about eight miles long; the Drin has a course of about 100 miles. From the outer slope of the western watershed of the Black Drin, several torrents fall into the sea; the Mati, or Mathis, the Scombi, and the Ergent or Beratino, may be named; this latter, indeed, has its sources to the east of lake Ochrida; it is estimated at 130 miles in length.

The Porò or Vojuzza, the ancient Aous, falls from the northern extremity of Mount Pindus, and near the point of divergence of the transverse chains already noticed has two considerable affluents: the Diznitza on the right, and the Argyro Casto and Soutchitza on the left; it may have a course of 150 miles; near its mouth, the coast is covered with lagunes; its southern watershed is extended from Mount Zigos to Mount Chimæra; from its outer slope several small streams unite their waters in the lake or lagune of Butrinto or Vivari, which is about five miles long.

To the south, the Calamas flows through a fertile country for more than 100 miles; it receives several affluents, the principal of which is the Karanitza. From the right, this river has its principal source in the eastern watershed of the lake of Janina, which lies enclosed in mountains 2500 feet above the sea, and the waters of which are said to unite themselves with those of the Calamas by subterranean channels. This lake is five miles long by three broad; and between the valley of Janina and Mount Zigos the river Arta has its rise. This river flows through a narrow valley, and has no considerable affluent; its length may be above sixty miles, and it falls into the gulf of the

same name, the present mouth being two miles to the east of the old one ; it is navigable for fifteen miles, but its entrance is impeded by sand-banks. This gulf is the ancient Ambracian Gulf, and it also receives the waters of the Liris, which may have a course of thirty-five miles ; to the north of this is the Mavro or Mauro Potamo, a rapid torrent with an irregular and tortuous current, flowing through a wild and rugged country.

The Aspero Potamo, the largest river on this side of Greece, rises among the southern spurs of Mount Zigos ; it has a course of above 100 miles, at about one-half its length it is above 150 feet broad, and at its mouth in the rainy season, a mile and a-half ; it does not receive any affluent of importance, though on the right in its lower course it receives the surplus waters of lakes Castro and Vrachori, the latter being about six miles in length.

All the rivers of the western slopes of the Greek region are little better than mountain torrents, most of them dry during part of the year ; they flow through hollow valleys, among broken and rugged mountains, in some places still covered with forests.

3 *The Rivers of the East.*—The southern slope of the Emineh Balkan presents some considerable streams, all of which, however, flow into the Ægean Sea, or Archipelago, the south-east extension of the watershed of the country towards the Bosphorus being too close to the shore of the Black Sea to leave room for more than one considerable stream ; and this is also the case with the coast of the Sea of Marmora, for the chain is continued south and west into the Thracian Chersonese, and then nearly surrounds the basin of the Maritza, the most easterly river flowing into the Ægean.

The Maritza, the ancient Hebrus, rises in Mount Egrissou, and its head waters open communication with those of the Isker and Nid, by the passes of Souli and Kis Derbend, as also with the head waters of the Kara Sou, from which it is separated throughout the rest of its course by the continuous rampart of Despoto Dagh ; this forms a natural barrier between Thrace and Macedon, covered externally by the fosse of the Kara Sou, and separating the fertile plain of Roumelia from Greece proper. The Maritza has a course of above 250 miles ; it receives the waters of two considerable streams near the centre of its valley ; the Tondja on the left, and the Arda on the right ; below these, two others, the Salsdere and Tekedere, join the main stream, and swelling the eastern feeders of the Tondja, open communication with the shores of the Black Sea ; all these are confined within the upper basin of the Maritza by the spurs of Despoto Dagh, which press closely on the river, and leave but a narrow channel for its waters ; its lower course of about forty miles is through the level country which extends along the coast of the Ægean.

To the west of the Maritza is the Kara Sou or Mestus, which flows through a narrow valley for about eighty miles, not receiving any affluent ; its mouth is opposite the island of Thasos ; still further westward is the Struma, also called Kara Sou, the ancient Strymon. This river has three well-defined basins, the upper encircled by mountains, but affording communication with the valleys of the Maritza, Vardar, and Isker ; the middle basin widens, and in the lower it flows through a lagoon, called lake Tikinos ; its valley is fertile, and was formerly noted for its mineral wealth ; its course may be 150 miles. Irregular spurs from the Balkan separate the Struma and Vardar, and project into the sea a massy promontory, the ancient Chalcidice, from which three peninsulas extend, surrounding the gulfs of Monte Santo and Cassandra, and separating them from those of Contessa and Salonika ; the most eastern is the famous Mount Athos, now Monte Santo ; the whole country, so famous in ancient story, is all but devastated.

The Vardar and Indje Mauro, or Nazilitza, flow into the gulf of Salonika. The upper course of the Vardar, formed by three considerable streams, is a succession of rapids ; after their confluence it flows through a fertile and beautiful valley ; the Vistritza, a confluent of the lower course of the Vardar, flows through a lake of the same name ; the Vardar has a course of about 175 miles ; the valleys of the affluents of this river open communication between the Ægean

and Adriatic by the valleys of the Drin and Poro, while its main source is in immediate connexion with that of the Morava; it must therefore always have considerable political and commercial importance. The Indje Mauro, or Nazilitza, has one of its sources in lake Castoria, which may have a diameter of five miles; this river has a rapid and irregular course of nearly 100 miles.

To the south of the Indje Mauro, and separated from it by the chain of the Camburnian Mountains of the ancients, is the Salembria, the ancient Peneus, the river of Thessaly, which has its main sources in the south-eastern slopes of Mount Zigos, and its secondary source in Mount Gura Vouno, part of the ancient Othrys, about seventy-five miles distant, north-west and south-east; it finds its way to the sea through the narrow defile of Tsampas, the ancient Tempe, between Olymbe or Lacha, and Kisova, the ancient Olympus and Ossa. Few valleys exceed this in natural beauty and fertility; it is surrounded, as has been noticed, by mountains; its natural outlet is not, however, by the Salembria, but by the gulf of Volo, to the south, between which and the valley of the Salembria, lies lake Carlos, the ancient Bœbeis, which is nearly ten miles in length, receives several small streams, but has no outlet for its waters. There are many such lakes of small size within this region, a consequence of the irregular and broken surface of the country.

The Salembria has several affluents, the principal are the Fanari from the south-west, the Saranta Poros, the Eurotas of the ancients, with the Sataldje, the ancient Apidamus, which may perhaps be rather considered a confluent, and its affluent, the Emicassuos or Phœnix, from the left.

The Hellada, the ancient Sperchius, flows through a narrow valley between Othrys and Ceta into the gulf of Molo or Zeitoun; leading from this valley along the coast round the termination of Ceta, is the pass of Thermopylæ; it is about five miles in length, and the principal part covered by a morass. The Hellada has a course of above fifty miles.

South of the Hellada is the valley of the Mauro Potamo, or Gavrios, the ancient Cephissus, flowing into Lake Topolias, or Copais, which has no outlet for its waters except by subterranean channels, both natural and artificial. This lake varies much in size with the season; when at its highest, its length is about sixteen miles, and its breadth eight; it is, however, frequently in summer only a marsh, and is still famous for its eels; it is 1000 feet above the level of the sea. The Cephissus has a course of above fifty miles; and the lower portion of its valley, as well as the shores of Lake Copais, were famed for their fertility. The other Cephissus, near Athens, in Attica, has only a course of about twenty-five miles, and is an insignificant stream; the Asopus, which flows into the channel of the Negropont, has about the same length. The promontorial extension of Attica round the gulf of Egina, the Saronic Gulf of the ancients, presents no valleys sufficiently large to form rivers.

4 *The Isthmus and Morea.*—The isthmus of Corinth, which connects the peninsula of the Morea, or Peloponnesus, with the promontorial mass of northern Greece, is about twenty miles long, and varies in breadth from four to eight; its northern limit is formed by a transverse spur, the ancient Geraneia and Oneia, which extends across it from the extremity of the extension of Mount Cithæron to the south-west, now known as Mount Polkorouni and Makriplai. On the south the Morea spreads to the west round the gulf of Corinth, and on the east along the Saronic Gulf, here forming a promontory thirty miles long by fifteen broad, the ancient Argolis, to the south of which is the gulf of Nauplia, anciently of Argolis; it is from the head of this gulf that the mountains which form the framework of the peninsula diverge in six distinct chains, the directions of which are marked by six promontorial extensions from the principal mass; these terminate respectively in Capes Skylo, Malio, Matapan, Gallo, Tornese, and Papas, known to the ancients as the promontories Scyllæum, Malea, Tænarium, Acritæ, Chelonites,

and Araxus. The range, of which the former is the extremity, was anciently called Arachnæus, now Sophico; it is of inconsiderable elevation; it extends eastward from Mount Cyllene, the central point of the whole, about fifty miles, from which to the south Mount Mallivo, the ancient Artemisus, and its extension, Mount Zarax, form the coast line on the east, and limit the plain of Arcadia and the valley of the Eurotas on the west; Mount Chilos, the ancient Croniûs, extending westward, bends southward round the valleys of the Kokla and Pirmatza, the ancient Colus and Pamissus, and throws out a spur to the south, between the latter river and the Eurotas, now called Pentidactylan, the Taygetus of the ancients, which culminates on Mount St. Elias 8000 feet above the sea. This range may be fifty miles long, and the more western, known as Mount Tetrasi, the Ægaleus of the ancients, forty from Cyllene to Cape Malio, is ninety miles. The western range extends from Cyllene about sixty miles, throwing off a spur to the south round the river Igiaco, the ancient Peneus, and to the north to the promontory of Drepanon, and the ancient Rhium, at the entrance of the Gulf of Corinth; it is known as Olonos, the Oloneia of the ancients, and by other local names.

The principal river of the Morea is the Roupbia, the ancient Alpheus, which has a course of above 100 miles, and several considerable affluents, which drain the entire area of the plateau of Arcadia: its southern sources and those of the Klitor, its confluent from the Nare, about fifty miles apart. The upper course of this river is irregular, broken, and rapid; the plain about its lower course is of great fertility. The next in importance is the Ires, or Eure, the ancient Eurotas, but it has only a course of fifty miles, and does not receive any considerable affluent; its valley is also remarkably fertile.

## CHAPTER XXII.

### ON THE VEGETATION OF EUROPE.

1. General view.—2. The northern region.—3. The central region.—4. The southern or Mediterranean region.

**GENERAL View.**—It has been noticed (P. Gr., p. 330) that the vegetation of the European continent is naturally distributed over three regions: 1. Of the saxifrages and mosses; 2. Of the umbelliferæ and cruciferous plants; 3. Of labiatæ and caryophyllæ; and occasional short notices of the vegetable products of different portions of this division of the great eastern continent have been interspersed here and there in the course of its description. As, however, the recent labours of botanists, especially of Schouw, in classification and localization have presented this subject to us as nearly complete, so far as its geographical application is concerned, it may be well to append here a general statement of the results of their labours, which have been lately presented to us in a popular form by Mr. Henfrey. (*The Vegetation of Europe*. Van Voorst.)

In the division of Europe for botanical purposes, perhaps it might be more easy to separate the mountains, table lands, and plains, and in this case there would be:—

1. *a.* A southern principal mountain chain, the Alps, and continuations east and west.
- b.* A central highland, the German, Bohemian, and Carpathian mountains.
- c.* A north-west highland, the mountains of Scandinavia and Great Britain.
- d.* A south-west highland, the Spanish peninsula.

- 2 a. The plateau of Spain.
6. The plateau of Bavaria.
- 3 A great plain extending from east to west, and bounded by the central and northern highlands.

Besides these, there are the plains of France, Lombardy, Hungary, and the Danubian Principalities, more properly to be considered as the lower portion of river basins, differing therefore in character from the great northern plain.

The distribution of vegetable life depending on position, soil, and temperature, including under these heads position, both vertical and horizontal; soil, whether natural as of rocks in situ, or of that formed by their collected *débris*: and temperature, both with respect to heat and moisture. Of the second, a general outline has been given in the chapter introductory to the Descriptive Geography of Europe. (p. 283.) Of the third, in its general relation to the temperature of other parts of the earth's surface, sufficient information may be found in the chapters on Meteorology, in the physical portion of this work; but it will be necessary, with special reference to the vegetation of Europe, to add to what has been there said. The first must of course be a local consideration.

With respect to the temperature of Europe, viewed in this aspect, it may first be noticed that a line, indicating a mean temperature in January of  $32^{\circ}$ , or corresponding to the freezing point of water, would pass along the western coast of Norway from the island of Stadland, through Bergen to Amsterdam, cross the Danube near Passau; the Save near Brod; and skirt the south bank of the river, from Widdin to Sistova; passing out at Varna, crossing the Black Sea to the mouth of the river Rioni. This may be called the line of normal temperature of European winter. To the south of it we find the western portions, Belgium, France, part of Bavaria, Spain and Portugal, Italy, Dalmatia, part of Croatia, Turkey and Greece; to the north the Danubian provinces, Russia, Hungary, Arabia, Sclavonia, Bohemia, Northern Germany, Holland, Denmark, Sweden and Norway. It should, however, be observed that, with respect to other portions of the world, as the general thermic normal—*i. e.*, the lines of average temperature for the latitude—passes along the eastern shores of the Black Sea to the mouth of the Don, within the chain of the Caucasus, does not extend westward beyond the meridian of  $37^{\circ}$  east, and then assumes a north-east direction round the source of the Volga, nearly the whole of Europe has a winter temperature above the average due to its latitude; while, as the thermic normal of July just touches the western coast of Portugal throughout its entire length, and then passes through the Irish Channel and across Great Britain, from the Solway to the Firth of Forth, Ireland and part of Scotland are the only portions of Europe in which the summer temperature is below the average. It will be seen, also, on inspecting an isothermal map, that the winter and summer isotherms, or lines connecting places having an equal temperature, have a tendency to assume contrary directions, the former especially in the north falling from north-west to south-east; the latter, excepting in the north-east, rising from south-west to north-east. These lines cross each other, and their points of intersection will be found to the north of Cadiz; and at Malaga, in Spain; at Bordeaux, Rochelle, near the Land's End, the mouth of the Maas, at Bergen; near Lake Mioren, Linsall, and Umea, in Sweden; and, omitting those further north, to the east of Lake Ilmen, at Tambow, near Saratov, and Kiev, in Russia; to the east of the Sea of Azov; near Zabatz, on the Save; near Passau, on the Danube; and to the west of Messina, in Sicily; this, the most southern intersection is of the lines of seventy-seven and fifty, and corresponds to that of Malaga, while the more northern at Umea, is of the lines of twenty-four and fifty-nine; the former intersecting that of seventy-seven to the east of the Caspian, and showing very clearly that all the countries within these limits have great heat in July; notwithstanding the cold in

January. The greatest extremes are found on the east near the Caspian; the most equal temperature, on the Atlantic sea-board.

With respect to moisture, it may be observed that almost the whole of western, northern, central, and eastern Europe, lie within the limits of the autumnal rains. These differences are, however, observable. In the centre and on the north-east, the rain-fall is comparatively little throughout the year, being below fifteen inches in Prussia, Poland, and Russia, and rising to twenty-five inches to the south and west; in the north-west, and south-east and south-west, the average is greater, varying from twenty-five to thirty inches; but in the south-west of Norway, the north-west of Scotland, the south of Ireland, the south-west of England, the north-west of France, and west of Portugal, as throughout the whole length of the Swiss Alps, the average is thirty-five inches; the increase is on the western slopes of the mountains; the table-land of Castile is an exception, the average there being ten inches; the south-western extremities of Spain, Portugal, Sicily, Italy, and Greece, lie within the limits of the prevalent winter rains, and are, the former excepted, comparatively dry.

Ireland, the Scandinavian mountains, the Balkans, the Alps, the Pyrenees, and the Sierra Nevada are within the limits of the snow line, either from elevation or position; the Carpathians, Apennines, the mountains of Corsica, and Etna, in Sicily, are just without it. On the north, the elevation of the line may be stated roughly as 2000 feet above the sea; on the south, 10,000. Glaciers are found in the Scandinavian mountains and in the Alps; 'indications of them' in the Carpathians and Pyrenees.

With these preliminary considerations, a more particular description of the three regions into which Europe has been divided botanically, may be entered upon.

2 *The Northern Region.*—This may be divided into the Scandinavian peninsula, and the great northern plain.

The Scandinavian mountains are for the most part composed of primitive rocks, of which gneiss predominates; the longer slope towards the east has a continental climate; the shorter to the west a maritime; the mean temperature on the one being about  $42^{\circ}$ ; on the other  $44^{\circ}$ . The winter is however  $5^{\circ}$  warmer on the east, being protected on all sides from the extreme cold of the Arctic regions, but the summer is  $1^{\circ}$  colder. The following examples give some idea of the relative temperatures of different parts of this district:—

	Mean Temp.	Winter.	Summer.
Stockholm . . . .	$42^{\circ}$	$25^{\circ}$	$62^{\circ}$
Drontheim . . . .	40	23	59
Umea . . . .	35	14	57
North Cape . . . .	32	23	$43\frac{1}{2}$

The difference of latitude  $12^{\circ}$ , Stockholm being in  $59\frac{1}{2}^{\circ}$ ; the North Cape  $71^{\circ}$ ; and Drontheim and Umea about  $64^{\circ}$ . At the latter place mercury has been frozen, indicating a temperature  $36^{\circ}$  below zero.

The seasons in Scandinavia are not dissimilar from those usually found within the same latitudes; the long days in summer bringing on vegetation with great rapidity. The eastern side is drier than the western; the annual rain-fall at Stockholm being seventeen and a half inches, and at Bergen seventy-seven and a half; but these are probably extreme cases. The snow line in the south has an elevation of 5300 feet, and in the north of 2300. Forest trees abound throughout the peninsula. The most prevalent are the birch, which reaches  $70^{\circ}$  of north latitude, the Scotch fir  $69^{\circ}$ , the spruce  $67^{\circ}$  on the west, but on the east  $69^{\circ}$ . Of others, the hazel reaches  $65\frac{1}{2}^{\circ}$  on the west, and  $63^{\circ}$  on the east; the lime  $64^{\circ}$  on the west, and  $63^{\circ}$  on the east; the elm  $63^{\circ}$  on both.

In elevation, three zones are discernible—of the conifers, of the birch, and of Alpine plants. The limits of the two former are, in the south 2800 and 3500;



and in the north 700 and 1500. The latter ascends to the edge of the perpetual snows, consisting of dwarf birch, bright-coloured perennial flowers, lceland and rein-deer moss.

Of the cereals, barley is cultivated as far north as  $70^{\circ}$ , at an elevation of 800 feet under the 67th parallel, and of more than 2000 under the 60th. Rye will ripen at  $67^{\circ}$  on the west, and  $65\frac{1}{2}^{\circ}$  on the east; oats at  $65^{\circ}$  on the west, and  $63\frac{1}{2}^{\circ}$  on the east, but are not much cultivated beyond the 60th parallel.

In southern Sweden, a district of lakes, and where sedimentary rocks form a considerable portion of the surface, the same flora is found, with the addition of the beech and oak to the forest trees; the former reaches  $58^{\circ}$  on the west, and  $56\frac{1}{2}^{\circ}$  on the east. Here three districts may be characterized: of East Gothland, the eastern portion of which presents a luxuriant vegetation, while the beech is predominant in the west; of West Gothland, in which pine forests are found on the coast; and South Gothland, where the pine is succeeded by the beech, with the elder and honeysuckle. The eastern islands being of calcareous formation, have a flora approaching to that of the Austrian Alps. Here orchises are found in abundance. Oeland is stony and comparatively desert. Passing into Finland, we find the average temperature of Abo  $23^{\circ}$  in winter,  $60^{\circ}$  in summer, while the mean is  $40^{\circ}$ , the annual rain-fall being twenty inches. The forests consist of Scotch fir and birch, with oak as far north as Biörneberg, in latitude  $61\frac{1}{2}^{\circ}$ . Here the difference in the seasons is greater than in the Peninsula; the annual mean temperature lower, and rain-fall less; the causes influencing these conditions are distance from the great regulator of temperature, the Ocean; proximity to a frozen sea on the west, and a frozen continent on the east; the eastern side is therefore colder than the western.

In Lapland, on the Swedish side, the three zones already noticed may be still distinguished, but these may here be subdivided with advantage. In the coniferous region there is a lower zone of vast swamps and sandy tracts, with corresponding vegetation of water plants, abundance of sedges among dark and gloomy woods, the plains being covered by creeping plants. Above, the spruce fir predominates, and attains a greater development and elevation than the Scotch fir in the Alps, in the hot, moist, and confined valleys. The forests here are dense, and there are extensive marshes; and this region occupies the lower hills and more elevated plains to an elevation of 1400 feet, above which pine forests are found on the sides of the mountains, but in the valleys the spruce attains a greater elevation.

The region of birches has also been subdivided, but it is to be observed that the *betula glutinosa* mixes with the *betula nana* in the upper districts, dwarfed and stunted, but attaining considerable development in the lower. The general extreme elevation of the birch may be stated at 2100 feet. Throughout Lapland the summer vegetation is peculiarly rich and luxuriant, the flora being, in consequence of the continued heat of the short summer, composed largely of plants naturally belonging to more southern regions. This is particularly the case in the Alpine region, where vegetation can scarcely be said to reach the snow line, few of the elevations being so high. On the east of Lapland the vegetation approaches in character that of Siberia. On the west, as in Norway, there is a maritime region, which is not found in the east, and which is characteristic of its flora. The difference of temperature is also in every respect considerable, of which the following comparison is afforded:—

	Annual mean.	Winter.	July.
Nidarosia . . . . .	$40^{\circ}$	$19\frac{1}{2}^{\circ}$	$64\frac{1}{2}^{\circ}$
Island of Mageroe . . . . .	32	22	40

The maritime region extends, though not continuously, being broken by the deep indentations of the numerous fiords, to the most northern point, and is characterized by maritime plants commonly found in more southern latitudes.

Attached to Finland on the east and south lies the great plain of Russia, surrounded for the most part by land, having no maritime influences but from the Black and Caspian Seas; its climate and productions are continental. The temperature of its different parts may be seen from the following table:—

	Elevation.	Latitude.	Annual.	Winter.	Summer.
St Petersburg . . . . .		60° .	38½° .	16° .	62°
Moscow . . . 484 feet . . .		56° .	38½° .	11° .	66°
Kazan . . . 120 „ . . .		56° .	36½° .	11° .	63°

From which it will appear that Moscow has the winter of the most northerly part of Europe, with the summer of France; to which it may be added that at Kazan mercury sometimes freezes, and that the shores of the Sea of Azov and banks of the Volga, at its embouchure, are frozen every winter. Throughout this region the rain-fall is very unequal, twenty-one inches is given as the average at St. Petersburg, while on the south it is recorded that rain has not been seen for twenty months, but in wet years it often saturates the deep clay soil so as to interrupt agricultural labour. In summer there is often neither rain nor dew, the soil cracks, and vegetation withers; possibly 6½ inches might be taken as a mean, if an average in such a case could be useful. The prevalent winds are from the east and north.

In Arctic Russia the spruce forests are scarcely seen; but a zone of low birches and willows is succeeded by dwarf birch and Arctic ericaceæ; with these the continuous turf ceases, and is replaced by isolated tufts of ranunculus, saxifrage, or grass, the ocean being bounded by an extensive, low and desert tract of country.

To the south of this region, the provinces of northern Russia are characterized by dense forests of pine and spruce, with occasional groves of alders and birch, the former usually indicating the limit between cultivation and the wilderness. These are interspersed with occasional plants of aspen, mountain ash, and wild cherry. A subdivision may, however, be made here with advantage: the clayey and marshy lowlands, which are found on the old red sandstone formation, produce spruce, intermixed with aspen and alder; the low hills of sand and diluvial deposit bearing the Scotch fir and birch, and in this district open heaths are also found. In the bogs of the clayey lowlands of Northern Russia, two vegetable formations are also distinguished, the one where the bog, properly so called, is covered with turf, and produces the cranberry, stunted birch bushes, willows, &c.; the other, in which the bog moss is not found, the bottom is firmer, and the characteristic vegetation is formed of sedges and cotton grass, while water-lilies float on the surface of the pools. Throughout this portion of Russia the rivers form deep channels in the plain, their valleys presenting two terraces; the upper, about fifty feet below the forest, is usually cultivated; its surface is undulating, and its hollows occupied by swampy meadows; the lower horizontal, covered by the inundations of the river, and affording fertile meadows. The course of the river is on the right side of the valley, immediately below the steep escarpment of the upper terrace.

In Central Russia the pines and firs decrease, and the aspen forms dense and extensive forests, as does the birch; these are replaced by the oak, ash, and lime, with an underwood of hazel and thorn: of these, Jaroslaw, 160 miles north-east of Moscow, is the northern limit: the characteristic difference between Northern and Central Russia is, however, that in the former the forest, and in the latter the open country, occupies the larger area. The forests have, however, been extensively destroyed both in Central and Northern Russia; formerly forests of larch and Russian cedar were frequent to the west of the Dwina, but are now only found to the east in the government of Wologda, on the river Suchonâ, which, with its confluent, the Jug, forms the Dwina, and is now the principal route from Wologda to Archangel; the stems of the fir and aspen attain an altitude of from 100 to 150 feet, and the birch not unfrequently of 100.

In Central Russia the magnesian limestone begins to predominate over the old red sandstone of the north; and on the south, the new red sandstone and mountain limestone form a marly soil, which, with calcareous marl, cover extensive areas. The influence of geological formation on botanical development is well marked here, for with the calcareous soil the central region of vegetation encroaches on the northern, while, where opposite geological conditions prevail, as between the Dwina and Dnieper, the northern region extends towards the south.

As Northern Russia is characterized by the predominance of coniferous trees, and the Central by deciduous trees, the steppes of the south are no less distinctly defined; but the district of the Ukraine, where the calcareous rock still presents itself, is not dissimilar in the character of its vegetation to Central Russia. Oak, lime, aspen, poplar, ash, and maple form the forests, the undergrowth being hazel, but southern forms are abundant under the influence of a milder temperature. The peculiar characteristic of the flora of Southern Russia is, however, the result of the deep black mould which covers the alluvial deposit resting on the calcareous and tertiary formations; this protects the plants which grow in it from the long droughts of summer, and favours the growth of those species the roots of which strike deep into the soil; hence the character of the forest trees, and the gigantic development of several herbaceous plants, thistles, and umbellifers, the number and size of the fungi which specially characterize the flora of the Ukraine. The northern limit of this black earth is Tchernigsa on the Dnieper, and from thence passes north-east to Simbersk on the Volga.

The more southern vegetation is marked by the predominance of fruit trees and the absence of forests, which are only found in the swampy hollows and river bottoms; in these the oak is most abundant; this is the characteristic of the country about and to the south of Kiew and the Desna; while to the south the steppe, covered with dry grass and straggling herbs, of which the most remarkable are gigantic thistles, stretches from the foot of the Carpathians along the shores of the Black and Caspian Seas into Asia; about the latter it has a saline character; through these unvaried plains the rivers flow in channels often above 100 feet deep, fringed with reeds; but in their lower course their deltas and islands, and especially those of the Dnieper, are covered with a vegetation of the most extraordinary luxuriance, the numerous branches of the rivers flowing between forests of oak, elder, poplar, and aspen.

The peninsula of the Crimea partakes throughout its larger portion in the character of the country from which it projects. The range of limestone mountains running along its southern coast, and presenting their longer slopes to the north, divides it into two distinct botanical regions; on the northern, the beech is the most considerable forest tree; on the south, the Corsican pine covers the declivities of the mountains from a height of 3000 to 6000 feet, and the *arbutus* is found; here the vine, olive, laurel, pomegranate, and all southern European fruits flourish; the vine is also cultivated on the northern slope, but for this the climate is scarcely fitted; the more common fruits, however, are cultivated with success.

To the northern division of Europe belong also the countries on the southern shores of the Baltic; these are attached to the great eastern plain by the marshes and forests of Lithuania and Poland. This district has its surface rising generally from the North Sea to an elevation of about 1000 feet; of this the larger portion lying below the level of 300 feet, is formed of alluvial deposits, above which is a terrace of stratified rocks, rising from 300 to 500 feet, and above this another terrace, attaining an elevation of 1000. This latter is found about the upper basin, and forms a zone round the Hartz Mountains. The intermediate terrace is formed on the edge of the stratified rocks in Westphalia, Osnaburg, and Brunswick, while the lower plain extends from the shores of the North Sea to those of the Baltic, including the heaths of Luneberg and the geest of Altmark. The upper terrace is formed of rugged limestone and argillaceous

strata, which determine the character of its vegetation, the lower plain has also two characteristic features; the argillaceous marsh once covered with forests of deciduous trees, and the geest, a sandy formation, apparently once a sea bottom, originally covered with heaths, it is now almost everywhere cultivated, and is bounded by the calcareous marshes of the coast. Along the western coast arenaceous tracts are spread; the dunes by which it is protected being held together by grasses and creeping plants, while the marsh presents a rich growth of grass, bordered with maritime plants. More inland are found dry heaths and damp peat mosses; where heath alternates with cotton grass and bog moss, and the country is remarkable for the poverty of its flora, having scarce twenty indigenous plants; but cultivation has in many places clothed the country with woods as well as ordinary agricultural produce. Higher still, as in Brunswick, on the more undulating surface of the plain, a richer flora presents itself; here the north-west, west, south, and south-east parts are covered with luxuriant woods of beech on the limestone, chalk, and sandstone hills; of oaks, birches, and firs, by the help of man, on the sandy and argillaceous elevations; the birch and fir flourish in the plains, and the alder in the lower grounds, amid the fens and moors, which produce abundance of coarse hay.

3 *The Central Region.*—Surrounded and traversed by mountain ranges, the flora of this region must be distributed, as it must be subdivided accordingly. It may, however, first be noted, that the sandy level *landes* stretch out to the sea from the base of the mountains of Auvergne and the Cevennes; while the plains of Franconia, Bohemia, and Moravia, separated from each other by the Bohmerwald and the Moravian mountains, have an elevation respectively of about 900, 500, and 600 feet, and the plain of Hungary of 250. These are separated from the western mountains and plains by the deep passes of the Rhine and Rhone, the connecting point being at the Gap of Belfort near the Faucilles mountains.

The temperature of this district may be gathered from the following data:—

	Latitude.	Annual.	Winter.	Summer.
Bordeaux . . . . .	45°	57°	43½°	71°
Carlsruhe . . . . .	49	51	34½	66
Prague . . . . .	50	50	31	67
Vienna . . . . .	48	50	31	68
Pesth (500 ft.) . . . .	47½	51	31	70
Clermont (1344 ft.) . .	46	51	36½	64

To this it may be added, that at Vienna the difference between summer and winter temperature is 36°, in Paris 26½°, in Bordeaux 28°, and that the temperature of Clermont shows a diminution equal to one degree to every 220 feet.

The annual rain-fall is twenty-four inches in the west of France, at Prague fifteen and a half, at Pesth, eighteen; in all cases the increase is considerable on the mountain chains and valleys. The Carpathians alone of all the mountains of Central Europe can be said to reach the snow line; but the Jura and Cevennes, with the Riesengeberge and mountains of Auvergne, are covered with snow during a great portion of the year.

Throughout this district, although on its borders are found additions from the northern and southern floras, and there are, as might be expected, considerable differences apparent in different localities—as for instance in the west of France, where, in consequence of the mildness of the winters, southern plants attain a considerable northern extension—yet, as a whole, the character of the flora may be considered as uniform. The western coast of France is occupied by extensive heaths, with occasional woods of the Aleppo or coast pine. The hills and mountain ranges of France are covered with woods of beech and oak, with chesnut in the lower and warmer localities. The German forests are chiefly of fir, the prevailing forms being the Scotch and silver fir, and the Norway

spruce giving them a gloomy character, and often affording local names, as the Black Forest; but beech and oak are also found, and the chestnut flourishes in the valleys of the Rhine, Maine, and Neckar. In the Carpathians the dwarf pine and Norway spruce cover the upper slopes, and the beech the lower elevations.

The mountains of Auvergne rise from a plateau 3000 feet above the sea; here the prevailing tree is the Scotch fir, but the ancient lava streams are clothed with beech woods; the willow grows by the water-courses, and the ash in the pastures: the smaller plants indicate both the elevation of the district and a relationship to the flora of the Upper Rhine; rye is the grain in common cultivation, but barley, oats, and even summer wheat, are found on the sides of the mountains at a greater elevation, and hemp as high as 3300 feet: the mountain ash, and many sub-Alpine plants, attain here a vigorous development; above, the silver pine reaches 4000 feet. The region above the plateau is, however, most remarkable for its pastures, composed principally of Alpine grasses; on the Puy de Dome only sub-Alpine plants are found, but on the Puy de Sancy, at an elevation of 6300, the snow gentian and other true Alpine plants have been gathered; the only Alpine shrub is the dwarf juniper.

On the Jura, the lower region extends to about 1300 feet; the vine and maize are extensively cultivated, as are the cereals and fruits. The oak is the prevailing forest tree, but the beech forms extensive woods, and the walnut is plentiful; on the Swiss side the oak is less abundant, and the spruce fir is found. The middle region rises to 2300 feet; here the vine is very rare, maize more sparingly cultivated, but the other cereals common; fruit trees, also usually found; the prevailing forest tree is the beech, but oak forests are not wanting; the walnut is occasionally met with, and on the east, pine forests are found. In the mountain region, at between 2300 and 4300 feet, these conditions undergo a change; wheat is but little cultivated, barley and oats become the prevailing grain, but are not found higher than 3600 feet; fruit trees do not extend above 3300, and the vine and maize disappear altogether with the walnut tree; the oak is rarely met with; the beech, now seldom forming forests, mingles with the spruce fir, now the prevailing tree, and the pine becomes abundant; and sub-Alpine plants are found. In the upper region the pine is the prevailing forest tree, with which the spruce is interspersed, but the former does not extend itself above 4600 feet; with it, the smaller plants found in forests disappear, and the prevailing species are sub-Alpine. In the sub-Jurassic regions of France, Switzerland, and the Rhine valley, which on the east do not much exceed 1500 feet in height, and on the west are not so high, the character of the vegetation depends on elevation, soil, and exposure; in all parts of it the cultivation of the vine is common, and excepting where low flat plains intervene, the vineyards of this region may be considered as connected with those of the lower regions adjoining it. The western side of the Jura seems to be in this respect superior to the eastern. Vineyards are also found between the Jura and Vosges; on the southern slopes of the latter, and in the Rhine Valley; in Alsace, from Basle to Schaffhausen and to Constance; between the latter places the elevation, from 1300 to 1500 feet, renders the produce inferior.

The vegetation of the Swiss basin is characterized by pine forests. These are occasionally interspersed with beech, less often with spruce or oak; and plants similar to those of the districts of the Lower Rhine, are found on the plains of Eglisau, round Lakes Bienné, Neufchatel, and Morat, in the basin of the Lake of Geneva, and occasionally near the rivers; and the districts extending by Zurich, Neufchatel, Lausanne, and Geneva, most nearly resemble the lower region on the west side of the Jura.

The vegetation of the Vosges contrasts with that of the Jura as much as its geological structure; here are found 'ballons,' or domes of granite, surrounded by crystalline and sandstone rocks; on the former fir, on the latter beech woods prevail; and among the beech, oak and birch are scattered the

presence of the birch affords a characteristic difference, but the difference between the smaller plants of the Jura and Vosges is even more striking. Passing from the one to the other, the broom appears with other plants, denoting a colder and less fertile soil; heath and fern cover extensive tracts, and plants characteristic of wet soil are found in abundance; forests of spruce mingled with birch appear, and everywhere ferns, mosses, and lichens, while the sub-Alpine region approximates closely in its flora to that of the Alps. The species common to the Jura and Vosges are found in the latter at less elevations, as are those common to the Alps and Vosges. The vegetation of the Vosges appears to be closely allied to that of the Black Forest; but here the lower temperature and greater moisture remove the flora still further from that of the Jura, which is, however, continued in the Suabian Alps, where the chief characteristic difference is found in the presence of Germanic species, and in the plateau being covered with sandy tracts corresponding to those already described lying farther north. Of Central Germany, only a general notice can be given; and this may suffice, for notwithstanding the numerous local variations, the general character of the flora is still maintained. With a soil based principally on sandstone and limestone, is found vegetable life due apparently to a more southern latitude, and this is especially observable in the deep lateral valleys, as of the Saal, where the walnut flourishes with the almond, peach, quince and vine; and the woods present a great variety of species: oak and beech are abundant, hornbeam, aspen, lime and ash, with the sycamore are found, and birch, though less frequently. The vegetation of the undergrowth is no less varied and luxuriant, consisting of hazel, maple, hawthorn, guelder-rose, and other plants of the same character, with honeysuckle and lilac; on the sandstone, the characteristic vegetation is the pine, the Scotch fir predominates, the silver fir is usually found single; the spruce fir prevails in the Thuringian forests. The valleys are clothed with alders, willows and black poplars, while the lower slopes of the hills are covered with fruit trees.

On the Hartz mountains, the tree limit is remarkably low; the spruce, the natural limit of which should be 4500 feet, does not here attain a greater elevation than 3300; the beech, which should reach 4250 feet, does not exceed 2000; and while the lower slopes of these mountains correspond in their vegetation to the surrounding plains, the summits present a sub-Alpine, and even an Alpine, flora.

On the plains of Bavaria we find igneous rocks forming a large portion of the subsoil, but on the left bank of the Danube the secondary formations are extended to the river, and far to the east; here the prevailing forest tree is the Scotch fir, alders and willows fringe the water-courses; the lime flourishes on the low hills. The common crops are rye, wheat, barley, oats, and potatoes; water plants are very numerous.

The flora of the Carpathians is not well-known, the only explored portions being the western and northern. The mountain region is characterized by the beech, which attains about the same elevation as on the more northern Alps, but the walnut only reaches 1325 feet, and generally woody plants do not ascend so high. Their place is, however, supplied by herbaceous plants of gigantic size; and the meadows produce an extremely rich pasturage. The vine is not cultivated at an elevation exceeding 900 feet, but grain and orchard fruits extend themselves higher up than in Switzerland, and a large breadth of barley and rye is cultivated; these circumstances indicate a warmer, i. e., a more continental climate, which is confirmed by the character of the sub-Alpine and Alpine plants; the limits of the former are very distinctly marked; the dwarf pine extends above 5500 feet; and round the Alpine lakes the vegetation is extremely luxuriant; the reverse is, however, the case in the Alpine region, which in its sterility approaches that of Lapland, indeed, few mountain ranges present such rugged and barren summits, on one of which, Krivan, only ten flowering plants could be found.

The flora of the Carpathians is remarkable for its local diversity, which

is, however, easily to be attributed to the exercise of neighbouring influences. The slopes towards the north and east are clothed with luxuriant forest growths, which present a striking contrast to the flora of the great eastern plains.

4 *The Southern Region.*—The range of the Alps forms the natural limit between the central and southern regions, and consequently partakes, in its vegetation, of the characteristics of both; its course, elevation, &c., have already been described, and it has been also noted that the great mass of its summits are formed by crystalline rocks, principally granite and mica slate, below which granular limestone, and the more recent formations, especially mountain limestone, the most abundant of all, are found

*Table of comparative temperature.*

	Latitude.	Elev., feet.	Annual.	Winter.	Summer
Avignon . .	44°	.	39°	42½°	74°
Marseilles .	43½	.	58	47	68
Milan . .	45½	.	55	36	73
Geneva . .	46	1275	50	35	63
Peisenberg .	48	3281	42	29	58
St. Gothard .	48	6841	30	17	43½
St. Bernard .	46½	8148	31	18½	43½

From this it may be observed that the south-western slope of the Alps has a high mean, and comparatively little variation. On the plain of Lombardy, on the contrary, the climate is more continental, it being preserved from the influence of the sea breezes by the chain of the Apennines. At Milan, the highest recorded temperature has been 93½°, the lowest 5°. At Geneva the mean temperature is lower than at Paris, though the latter is 3° farther north, but having by the valley of the Rhone a south-west exposure, the winters are mild. Peisenberg has the mean temperature of Stockholm, but a milder winter and cooler summer. At the St. Gothard and St. Bernard the mean temperature is lower than at the North Cape; and the summit of Mont Blanc has probably a temperature of only 5° above Zero. Of the névé, glaciers, and snow-line of the Alps, full notice has already been taken. The rain-fall on the southern slope of the Alps is very considerable, viz., from fifty to sixty inches, and in Friuli 100. This results from proximity to the Mediterranean, for, on the west and east sides, it is, as has already been seen, less.

The warmth and comparative equality of temperature at the western foot of the Alps has been noted; this, with its peculiar position, shut in on every side but the south and south-east, gives the Mediterranean coast of France a peculiar flora; there, as well as on the Maritime Alps, orange, myrtle, cactus, dwarf palms, and the predominance of leguminosæ, give it a distinct southern character; the Aleppo pine and olive attain to 1400 feet, the evergreen oak to 1800, from which limit to 3800 there are no trees, but the green lavender and box supply their place; the beech region extends from 3800 to 5500, in the upper part mingled with pine, which predominates above 5500 and extends to 6000, above which is a region strictly Alpine; and here the *sax.* plant characterizes the vegetation which is found in the island of Bornholm just above the sea. The northern slopes of the mountains commence with the region of the evergreen oak.

Of the Alps generally, it may be noted that the lower elevations, about the base, rise above 1500, and above these is found a zone of chesnuts which extends to 2500; in the deep valleys of the south, however, this tree attains an elevation of 1000 more. In this region the vine and maize are cultivated; the beech zone extends from 2500 to 4000 feet on the south, and from 2000 to 4000 on the north, yet not unfrequently less elevated on the south than on the north. This is the zone of deciduous trees, which is marked with greater regularity on the Alps than on the German mountains: the cherry and ash attain about the same elevation as the habitation of man. The cereals depend

for their growth, perhaps, more on position than elevation, and under favourable circumstances, as where comparatively level valleys are found, often attain a great height. The zone of the coniferous trees extends to 5500 feet on the north, and to 6500 on the south; the Scotch fir is least common. Intermixed with these, and above them, the Alpine pastures spread their luxuriant grasses and brilliant flowers; and here the flora is as rich as it is poor in the fir woods of Scandinavia; and it may be added, that while the crystalline rocks are covered with the more abundant vegetation, the calcareous afford the greater variety of species.

In the Alpine zone the dwarf birches of the Scandinavian mountains are replaced by rhododendrons, and these are often intermingled with dwarf pines; a dwarf growth of alder is, however, not unfrequently observable; and immediately on the edge of the snow, and buried under it, excepting for the short summer, are found small rhododendrons and azalias, with abundance of the saxifrage, gentian, primrose, and ranunculus; and where the rocky cliffs rise out of the perpetual snow on the Central Alps, at an elevation of 10,360 feet; on Mont Cervin, at 10,461; on the Col de Geant, at 10,578; and on Mont Blanc, at 10,680; and on Mont Rosa, at 11,352, individuals of different species of those plants have been found; and between 8500 and 10,000, thirty-three different species, of which twenty-four occur in the Pyrenees, and the rest in the north of Europe, have been estimated.

The continental character of the vegetation of the higher Central Alps is shown by the following comparisons: the spruce there predominates over the Scotch fir; the latter prevails in Scandinavia, the former in Russia; the limit of the beech is low, but it is abundant on the shores of the North Sea, and is only found in the south of Russia: the limit of the vine is comparatively elevated, as is that of the cereals; and it has been supposed that in the absence of the heat, in other places required for these plants, light in some measure supplies its place; the dryness also of the atmosphere influences these conditions to a great extent, while vegetation is much favoured by frequent precipitations, which result from the contact of clouds with the cold surfaces of the névé and glaciers. The higher elevations of the Alps become thus clothed with verdure when corresponding elevations on lower mountains are barren and desert.

The Spanish peninsula, cut off from the rest of Europe by the Pyrenees, might be expected to have a peculiar flora; and its mountains differ as much from the Alps and the Scandinavian mountains in their vegetation as in their geological formation, for though granite groups and other crystalline rocks are found, it is principally on the east; clay-slate and oolite being the more extensive formations.

The temperature of these mountains may be imagined from the following data, however confessedly imperfect:—

	Latitude.	Elev., feet.	Annual.	Winter.	Summer.
Perpignan	42 $\frac{1}{2}$ °	—	60°	45 $\frac{1}{2}$ °	75°
Dax	43 $\frac{1}{2}$	—	57	44	69
Mont Louis	42 $\frac{1}{2}$	5195	43 $\frac{1}{2}$	31 $\frac{1}{2}$	57

It may be observed, that while the climate at the east end, near the Mediterranean, is milder, the difference of the seasons is less at the west. At Mont Louis the mean temperature slightly exceeds that of Stockholm, as has been observed of Peisenburg, the winter being warm and the summer cooler; but Mont Louis is more than 2000 feet higher above the sea level.

The vegetation of the Pyrenees is extremely rich and varied, being composed of plants found in most other parts of Europe, with some peculiar to them; below the Alpine zone the distribution of trees may be thus stated: the chesnut reaches 1400 feet; the oak 5000; the beech from 2000 to 6000; the spruce, fir, and yew from 4500 to 6000; the birch, common on the Alps and Scandinavian mountains, is wanting here, but the Scotch fir, characteristic of the latter, forms the zone above the spruce in the Pyrenees.

The Alpine zone commences at 6000 feet, and is marked in its lower limits



by stunted Scotch fir and rhododendrons; the latter attain to 6900 feet, above whose limit, though the pasture is covered with numerous flowering plants, the dwarf juniper is the only shrub; above 8400 perennial herbaceous glacial plants alone are found. We observe here the Arctic-European flora, and a portion of that of the southern mountains of the peninsula, mingling with species peculiar to the locality.

The peninsula of Spain, as already noted, is a country of table-lands and mountain ranges; it has few and comparatively unimportant low-lands in Catalonia and Arragon, on the sea coast at Valencia, and in Portugal; but the mass of the country has a mean elevation of 2000 feet; Madrid, in the centre, is 1995 feet, and Granada, on the south, 2560 feet above the sea: in the absence of more sufficient data, the temperature must be estimated from the following table:—

	Latitude.	Annual.	Winter.	Summer.
Lisbon . . .	38 $\frac{1}{2}$	62°	52 $\frac{1}{2}$ °	71°
Madrid . . .	40 $\frac{1}{2}$	59	43 $\frac{1}{2}$	77
Gibraltar . .	36	68	59	77

This, however, will afford but little information with respect to other localities; generally, however, it may be noted that the valleys between the transverse ranges open to the west, south-west, and south-east, and that the interior table-lands are protected from the influence of the sea to the north and south by high and continuous ranges of mountains, of which that on the south is the highest, rising 11,464 feet on the Cerra de Mulhacen. The peculiarities observable are that the continental climate is found at a much greater elevation than usual; as for instance, at Madrid, at an elevation of 2000 feet, where the extremes may be estimated as 105° and 15°, and the annual rain-fall at nine and a half inches, while at Lisbon it is twenty-eight; a zone of perpetual snow is found both to the north and south, in the former not exceeding 2000 feet, but broader in the latter; some of the higher plateaux are covered with snow during five months of the year, and present verdant pasturage in the spring. The mountains of the peninsula are formed principally of primitive rocks; the plateaux of sandstone. The southern maritime districts of Spain are characterized by a luxuriant and strikingly beautiful vegetation of trees; there are found the cork oak, the ilex, and other evergreen oaks; the laurel, myrtle, and arbutus, besides the cypress and stone pine; aromatic shrubs, sage, thyme, and rosemary abound, with brilliant and sweet-scented bulbous plants, the hyacinth, narcissus, and others of the same character; while the dwarf palm affords a link to unite them with the Tropical flora. The mountains on the north present forests of oak, with birch, Scotch fir, spruce, beech, and ash; in the south, principally of chesnut.

The cereals include not only those common to other parts of Europe, but maize, rice, and millet. The vine flourishes everywhere, especially about Oporto, Xeres, and Malaga; the olive and orange on the south and west coasts; figs, almonds, and mulberries are found in profusion, and the cotton plant and sugar cane are cultivated successfully in the south.

Seldom, perhaps, could a greater contrast be found within 100 miles than that presented by the vegetation of the Asturian and Andalusian provinces of Spain; both are exposed to oceanic influences, both protected on one side by lofty mountains, but the latter is open only to the warm and dry winds from Africa, the former to the moist and colder winds from the Northern Ocean; and consequently the vegetation approximates in character to that of Central and Western Europe; the trees are principally deciduous: chesnut, oak, beech, &c.; heath and furze cover the lower crests of the mountain ridges, and verdant meadows complete the likeness, which more nearly resembles the flora of the south-western counties of England than perhaps any other part of Europe; allied to the southern flora by the chesnut and evergreen oak, the latter, however, comparatively rare and poorly developed; the absence of conifers and cistaceæ is remarkable. ferns are abundant everywhere, and in

this the north-western districts of Spain afford a remarkable contrast to the north-eastern, which are distinct, not only on account of the different exposure but from the soil, which is composed of slate and marl, interspersed with rocks of breccia, with sandstone spurs from the mountains on the north, which are covered with Scotch firs, as the breccia is with the same tree, as well as oak and ash, and copses of box and maple, interspersed with mountain ash, holly, and shrubby beeches, and carpeted with verdant turf.

The western portions of the coast of the peninsula are not dissimilar from the southern in their vegetation; even as far north as Valencia, olives, figs, citrons, and oranges abound, and the date palm is found; rice is cultivated; the tamarisk grows near the sea, and the aloe and cactus on the rocks, the latter attaining a very considerable size. The Aleppo pine and apple of the Dead Sea are also found on this coast: on the mountains of the Sierra de Chiva, which culminates 6000 feet above the sea, the aloe and cactus characterize the vegetation for 500 feet, with the algaroba, or St. John's bread-tree, the dwarf palm, and arborescent heath; these latter extend to 2000 feet; and in this zone is found the feather grass, which affords material for sandals, baskets, &c. &c.: from 2000 to 4000 feet the slopes are principally barren, but the juniper, ash, and evergreen oak are found; from 4000 feet to the summits isolated pines, with a vegetation like that of northern Europe, and on the higher peaks an approach to an Alpine vegetation.

The valley of the Tagus is remarkable for the luxuriance of its woods of palm, elm, lime, beech, and oak; and the flora is allied to that of the chalk districts of England and the centre of Europe; while in that of Monchique, the huge stone pines, chesnut and cork trees, the Eastern rhododendron, lemons, oranges, and southern fruits, intermixed with the American agave, the ferns of Madeira, and pelargoniums of Africa, show that here the continental and maritime climates are in harmonious proportion. In Granada, on the southern slopes of the mountains, the great and long-continued precipitation both in autumn and spring, with the continuous drought of summer, afford a great variety; the autumnal rains produce liliaceous plants; annuals are in flower throughout the winter; the spring rains produce numerous flowers, and June and July herbaceous composite, umbelliferæ, and labiate; while August and September are the winter months of vegetable life. The warm region, with its characteristic southern vegetation, extends only 2000 feet upwards; here cereals require irrigation, but ripen in May and June. At the foot of the coast chain, in the alluvial plain of Malaga, the sugar cane, cotton, sweet potato, and date palm are found; the agave is naturalized; and there the white poplar is the only indigenous tree; above, the cork oak and pinaster characterize the vegetation of the plateaux: the most remarkable plants are the cistacæ; and in this the southern and central floras of the peninsula present no analogy to any other portion of Europe; for here two evergreen regions are apparent, the one similar to those of Italy and the south-east of Europe; the other more like what is found in the Crimea and parts of Asia Minor, and presenting close analogy to that of parts of California and Central America; and this appears to be caused by the extreme dryness of the climate, for which, in Europe, it is remarkable.

On the southern mountains, the region between 2000 and 5000 feet is assimilated to that of the central plateau; brooms and cisti are abundant; the pinaster ascends as high as 4000 feet; the evergreen and cork oaks to 3000, followed by the Pinsapo fir and Alpine oak, which extend to 6000; the ash from 3000 to 5000 feet; the elm from 2000 to 4000; the black poplar from 2000 to 5000; and the stone pine as high as 3000.

The region next succeeding corresponds to that of central Europe, and is marked by the predominance of coniferous trees, especially the Scotch fir; these appear formerly to have covered even the tops of the mountains. The decadence of woods throughout the peninsula, even on the central plateaux, appears a well-established and historical fact, and one which must have exercised much influence in producing the present state of things. The upper

region has a zone of Alpine shrubs reaching to 8000 feet, and above that of Alpine perennial herbaceous plants.

The ridges of the centre of the peninsula connecting the mountains of the north and south, and dividing the western and central plateaux from the valleys of the east, present varieties in accordance with the geological formation, for the most part assimilating to central Europe, the Scotch fir being the prevailing tree. The plateaux may also be classed according to their soil, and are principally of clay, gypsum, sand, or granite; the former is found mostly to the south of Madrid, the second to the north and west, having this peculiarity, that it becomes indurated by heat: limestone is found in the Sierra Cuenca, at the north and east; while gypsum extends with saliferous formations to the south and east. The clay, sandy, and granite soils are alike remarkable for the extent of surface covered with tomillares, or thyme plants, which in the latter attain an elevation of 4000 feet, but a very large portion of the surface of the peninsula may be considered as almost destitute of vegetation.

The peninsula of Italy is in its local flora the most favoured portion of Europe: Spain on the one hand, and Greece on the other afford, it is true, trans-Atlantic and Eastern forms of vegetable life, but the climate of Italy is more favourable than either for its development, and consequently vegetable life is there most abundant and most vigorous.

The peculiarities of the orography of Italy have already been noticed (Chaps. XIX., XX.); botanically the Apennines divide the peninsula into two regions, but the southern portion has its own characteristics, as have the detached mountains, especially those of volcanic origin; and although presenting striking contrasts, the valley of the Po and plain of Lombardy must not be separated from the Italian region; the latter affording comparison with the plains of Pisa, Naples, and the Campagna at Rome, as well as of Apulia on the Adriatic. The characteristic rock of the Apennines is limestone, generally compact in structure and grey in colour, but in some places highly crystalline, and presenting statuary marble of fine texture; primitive rocks are not, however, wanting, especially in the north and south. Volcanic formations are found chiefly at Vesuvius; the effects of earthquakes are noticed, especially in Calabria. Italy has numerous lakes of great size and importance; on the north, with the exception of the Po, the rivers are comparatively small; extensive marshes are found on the western coast of the peninsula, and the delta of the Po is of great extent.

The following table will afford comparative estimates of temperature:—

	Latitude.	Annual.	Winter.	Summer.
Milan . . . . .	45 $\frac{1}{3}$ <sup>o</sup>	55 <sup>o</sup>	36 <sup>o</sup>	73 <sup>o</sup>
Bologna . . . . .	44 $\frac{1}{2}$	57	36	76
Florence . . . . .	43 $\frac{1}{2}$	59	44	75
Nico . . . . .	43 $\frac{1}{2}$	60	49	72 $\frac{1}{2}$
Rome . . . . .	42	60	47	73
Naples . . . . .	41	63	50	75

It may be further remarked that the valley of the Po has a continental climate; here the winters are colder and the summers hotter than the due average; the winters become considerably warmer after the northern Apennines are passed, and the effect on the vegetation is very perceptible to the eye: to the south also, the temperature of the autumn is greater than that of the summer, and this becomes especially perceptible in Sicily, where, at Palermo, the month of September is the hottest in the year, the annual mean being 64<sup>o</sup>, the winter 52<sup>o</sup>, and the summer 75<sup>o</sup>, in 38<sup>o</sup> of latitude; and it will be observed that the summer mean is not so high as at Bologna 6 $\frac{1}{2}$  degrees further north, at Catania, the mean temperature of July and August is estimated at 80 $\frac{3}{4}$ <sup>o</sup>.

The rain-fall, especially on the southern slope of the mountains, is very considerable; at the foot of the Alps, fifty to sixty inches; on the northern face of the Apennines it may be about twenty-five inches; on the south much

more; in Sicily about twenty. The eastern slope of the peninsula has less rain than the western; summer rains are only abundant in the plain of Lombardy; snow is rarely seen south of Naples, excepting on the mountains, where it remains the greater part of the year, especially on the Abruzzi and Etna, but the line of perpetual snow is not reached.

The region of Upper Italy, or Lombardic region, extends from the Sesia to the Adige on the southern slopes of the Alps, and as far as the river Po; the influence of the warm and moist south-east winds not extending beyond the former river, excepting in the valley of Aosta. Brescia appears to be the point where the vegetation of the valley of the Po changes; it is in the marsh and rice grounds that the southern vegetation is most observable, but it extends even into the Tyrol, and more especially into the valleys of the lakes, and this proportioned to the eastern exposure, elevation of surface, and reflection of heat from the mountains; thus, round Lake Orta there are no traces of a Mediterranean flora; on the islands of the Maggiore the agave flourishes; round Como the olive attains an elevation of 1600 feet, and the vine of double that height above the sea; while in the basin of the Lake of Garda the orange ascends to 1200 feet, and the olive to 2000.

The whole of continental Italy has suffered much from the loss of its former extensive woods, and the different lake floras may have been united by Mediterranean trees clothing the lower slopes of the mountains. Where they remain on the sides of the mountain, the chestnut, evergreen oak, and stone-pine, are characteristic of the vegetation among the trees; and the odoriferous syringa among the shrubs, with bay, olive, and cypress. Lower down the sycamore, Italian beech, white-blossomed oak, with vines, mulberries, and pomegranates, the myrtle, and the box, while the olive and citron extend to the sea coast.

The flora of the district round Naples may be taken as affording an extreme type of that of the peninsula. The climate here is exceedingly variable, 16° of Fahrenheit being not an uncommon fall or rise during the day. In the months of January and February the thermometer has been observed 11° below freezing point, and on the mountains of the Abruzzi even more. Yet snow seldom lies on the lower lands. The summer comes on with great rapidity; the autumn and winter are warm and moist, and large quantities of rain not unfrequently fall on the coast.

M. Tenore has divided the Neapolitan district into ten regions:—

1 Of maritime plains. These are mostly marshy, covered with stagnant pools, having no trees but willows and poplars, and presenting a rugged growth of hemlock, tamarisk, and juniper. The maritime plants common to north-western Europe are here found.

2 Of the Mediterranean plains. These are sandy or argillaceous, with an undulating surface. Here are found the elm, maple, and mulberry, and the characteristic herbaceous plants are those of central Europe.

3 Of the lower hills. This extends from 300 to 900 feet, the soil still argillaceous or sandy, but not unfrequently mixed with volcanic products, in which, when disintegrated, the common fern flourishes. Here are found the southern trees—the evergreen oak and stone-pine, while the laburnum, and other leguminous trees, characterise the vegetation, and above this extends the regions—

4 and 5 Of the upper hills, in the 1° zone, in which the flora has a Jurassic character, and the trees approximate to those on the western slopes of that chain; the southern plants are represented by the under shrubs. In the 2° the conifers prevail, and the shrubs approximate to those of Northern Europe, this extends to nearly 2500 feet.

6 Of the mountains. This region is one chiefly of pasturage.

7, 8, and 9, are Alpine regions presenting a comparatively scanty flora, with a few wild shrubs, &c.

10 The glacial region, confined to a few isolated points in the Abruzzi.

Mr. Henfrey more simply distinguishes five zones:—

1. The maritime; 2. Of evergreens, extending to above 1000 feet; 3. Of chesnut, reaching to 3000 feet; 4. Of beech, to 3500; 5. Of Alpine, or perhaps rather sub-Alpine, vegetation.

The variety of elevation, soil, and exposure, present as great variety of vegetation in the Abruzzi. The orange and citron will not flourish, nor will the mulberry or vine; while on the southern coast silk, wine, citron, and orange are the natural products of the country. Here the sugar cane was cultivated, which will not grow at Naples; but there the camelia and plants from the Cape of Good Hope, New Holland, and Japan, grow in the open air; but American plants, as they are familiarly called—rhododendrons, kalemias, and azaleas, do not succeed.

In the island of Ischia, and at Castellamare, plants are found under the same parallel; and not half a degree of longitude apart from each other species are found indigenous characteristic of an Alpine and tropical vegetation.

All the conditions desirable for the development of a southern flora are found better fulfilled in Sicily, but even here the northern vegetation is not excluded, and is found beside the sugar cane, banana, date, and agave. The vegetation of this island presents four distinctly marked regions. 1. Of maritime plants. 2. Of cultivated plants, marked by the limit of the cultivation of the vine at 3300 feet on Etna. 3. The wooded regions extending to 6200, and above that, 4. A sub-Alpine region. The first is found to the south, and is limited both in extent and productions. The second is the characteristic of the country, and it is in this that the gardens and fields exhibit the vegetation of the south in luxuriance: here the orange, citron, lime, &c., extend to 2000 feet in elevation, though the date does not flourish much above 1500; the fig is fruitful above 2000, and cotton is found at an elevation of 1300. The cactus and prickly pear, lupines, asphodels, and asparagus, with the euphorbia, are characteristic of the inferior vegetation. The woods of Etna consist principally of oak, the ilex ascending to 3800 feet, the beech prevails between 3000 and 6000 feet; the birch, most rare in continental Italy, between 4750 and 6600; the pine between 4000 and 6200; the broom, peculiar to this locality, extends as high as 6000 feet, and when cultivated becomes a tree, which in its pendent flowers and leafless branches, seems the link between this flora and that of New Holland; the sub-Alpine region has a very poor flora. The chesnut trees of Etna, so remarkable for their size, are probably the result of cutting down the original growths, and allowing numerous shoots in close proximity to rise from the stools. A contrast appears between the wooded region of Etna and that of the Alps worthy of notice, the limit of that region upward being the same; the chesnut and beech attain an elevation 1300 feet higher on Etna than on the southern slopes of the Alps, as do also the cereals and the olive; here, too, the ordinary distinctions are not observable, and trees usually characteristic of different regions, as the beech, birch, and Scotch fir, are found together; while in the Alps the beech falls before the Scotch fir, which in Scandinavia does not attain nearly so great an altitude, thus marking strongly the modifications resulting from a southern latitude.

Dalmatia is the botanical link between Italy and Greece. On the south and west, the mild winters favour the early development of vegetable life; the almond blossoms in January; on the coasts are found the olive, arbutus, laurel, oleander, and stone pine, indicating the predominance of Mediterranean types; above, in the zone of forests, however, the flora is more nearly allied to that of central Europe, presenting the sycamore, oak, and beech; the woods do not rise higher than to 3000, and the Alpine flora commences at a low limit. The peninsula of Greece has a colder climate than that of Italy; here, however, accurate data are wanting, but in Candia, at Canea, lat.  $35\frac{1}{2}$ , the mean annual temperature is only  $1^{\circ}$  higher than at Palermo,  $2\frac{1}{2}$  further north, the winter mean being  $54\frac{1}{2}^{\circ}$ , or  $2\frac{1}{2}$  degrees higher, and the summer  $78$ , or about  $3$ ; the rain-fall is considerably less; the thermometer occasionally falls  $16^{\circ}$  below

freezing point, and snow, though rare in the lower lands, lies throughout the year on the mountains, yet the orange, citron, and prickly pear flourish in the Morea, the latter being used in Messenia for hedges; the orange and citron penetrate even as far north as Thessaly, and the olive reaches  $41^{\circ}$  north latitude on the coast of Macedonia. The west coast should be warmer than the east, Corfu producing the opuntia and date, neither of which is found in the vale of Tempe; on the west coast the olive, myrtle, orange, and citron abound, but at no great distance the vegetation changes for that of Central Europe; on the sea-shore also, the stone pine and pincaster flourish, and by the rivers, the oriental plane and oleander; the ilex and other evergreen oaks, limes, and horse chesnuts are the prevailing forms in the woods of middle altitude; while higher up the chesnut, northern oak, yew, and Scotch fir are principally found; but throughout Greece the woods are disappearing, more especially in the Morea.

The flora of southern Greece is closely allied to that of Italy, varied with African and Libyan forms, and the islands present transition series.

## CHAPTER XXIII.

### AFRICA.

- § 1. Historical sources of our knowledge of the interior.—2. Information to be expected.—3. The boundaries and limits.—4. The coast line.—5. The watersheds.—6. The orographical classification.—7. Classification of rivers.—8. Of the geological formation.

**HISTORICAL Sources of our Knowledge of the Interior.**—That Africa, nominally the land of Ptolemy, should still remain a *terra incognita* to geographers throughout the larger portion of its surface, may appear strange, unless we consider the unity of the Mediterranean region, the relation of its shores, and their separation, by the surrounding ridge of its basin, from the continental masses of Asia, Europe, and Africa, the latter never having been known to Europeans beyond its coasts, on which, as has been noted in the *History of Maritime Discovery*, they had made settlements, and erected forts for the prosecution of trade, latterly reduced to two staples, gold dust and slaves, the latter, it is to be hoped, shortly to be superseded by that of palm oil.

The information afforded by Ibn Batuta and Covilham scarcely extended beyond the Mediterranean basin, that of the former being limited by the chain of Atlas, and of the other by the valley of the Nile; and the object for which that of the latter had been collected, viz., the opening a passage to India, having been accomplished by the circumnavigation of the continent, and the attention of the maritime nations of Europe being for the time fixed on India and China in the east, and America on the west, inquiry into the character of the interior of Africa was postponed for a century and a half, until the conquest of Timbuctu by the Emperor of Morocco directed attention to the wealth of that city, as the emporium of trade, especially in gold; and in 1618 a company was formed in England to attempt to open communications with Timbuctu, by way of the river Gambia, and their agent, Captain Thomson, ascended that river for some distance, but he being killed by the natives in 1620, Captain Jobson was sent out, who returned safely, after attaining a higher point in the navigation of the river than his predecessor; yet, notwithstanding, no further attempt was made until 1723, when the African Society, under the presidency of the Duke of Chandos, sent Captain Stubbs up the same river, who ascertained that the Gambia had not any connexion either with the Senegal or Niger. After this, again the spirit of discovery in Central Africa slept for some time, though towards the close of the century, James Bruce, of Kinnaird, now deservedly celebrated as one

of the most noted on the list of modern travellers, had reached the sources of the Bahr el Azrek, or eastern head waters of the Nile, in the year 1770, and became intimately acquainted with Egypt and Abyssinia, and the connexion of those countries with Arabia; and in 1793, Mr. Browne, penetrating into Darfur, obtained information respecting the Bahr el Abiad, or western source of the same river; but in the interval an association was formed for the express purpose of promoting discovery in the interior of Africa, and John Ledyard, an American by birth, who had sailed with Cook, and afterwards made a pedestrian journey into Siberia, was sent to Cairo, to join the caravan of merchants and traders to the centre of Africa, but he died at Cairo, in 1789. Mr. Lucas, who had been for a long time vice-consul at Tripoli, undertook to penetrate from thence into the interior, but failed in consequence of an insurrection of the Arab tribes, and the information he obtained, though in itself useful and important, tended only to obscure, instead of elucidating, the geography of the continent; and Major Houghton, even less successful in his endeavour to open out the country to Europeans by way of Morocco, lost his life in the attempt. In 1795 the old route of the Gambia was again attempted, and Mungo Park, a Scotchman, and of the medical profession, notwithstanding a captivity among the Moors in Ludamar, succeeded in reaching the Niger, and followed the course of the river to Silla, but being destitute of means for the further prosecution of his discoveries, he was obliged to return home. To extend what Park had so well begun, Frederick Hornemann, a German, was sent out in 1797, by way of Egypt, though Fezzan. He appears to have reached the Niger, and died of sickness, as did Mr. Nicholls, who attempted to penetrate the interior from the Bight of Benin. In 1804, Park started again with a large and well-organized party, by the way of the Gambia, to trace the Niger to its source. He succeeded after many difficulties in reaching the Niger, on the banks of which he built a vessel, in which he descended the stream, until, in a quarrel with the natives, he was killed at the rapids of Boussa. Roentgen, a German, was also killed in the attempt to penetrate into the interior from Morocco; and the Swiss Burkhardt was carried off by dysentery, before even the years of probation which were necessary to fit him in his own estimation for the work, were expired: but Adams and Riley, American seamen, who had been cast on the coast by shipwreck, obtained much useful information, visited and described Timbuctu. As Sir Joseph Banks and Mr. Beaufoy had given the original stimulus to African discovery, so Sir John Barrow maintained it, and by his influence it was principally that in 1816 Captain Tuckey and Major Peddie were sent out in command of two expeditions; the former proceeded up the Congo, but fell a victim to the malignity of the climate, as did the latter, who never reached the proposed scene of his labours. He was succeeded by Captain Campbell, and he again by Lieutenant Stokoe; but these also died, without being able to get beyond the confines of the Toulah country, in their endeavours to reach the Niger. In 1818 Mr. Joseph Ritchie was appointed vice-consul to reside at Murzuk in Fezzan, and in company with Captain Lyon, reached that place, where he died, and Lyon returned in 1820. Their places were, however, more than supplied by Dr. Oudeney, Captain Denham, and Lieutenant Clapperton, who reached Murzuk in 1822, and early in the following year were the first Europeans who saw Lake Chad. Denham also crossed the Shari, and reached the east coast of the Chad; Clapperton and Oudeney proceeding westward, the latter died at Murmur; the former reached Sokatu, on the river Quarama, an affluent of the Niger, which at its junction has a southerly course, in the country of the Fellatahs, and with Denham returned safely in 1825; immediately after which Clapperton undertook to penetrate to Sokatu from the coast, which he succeeded in doing, crossing the Kong Mountains, and reaching Boussa on the Niger, where he obtained information respecting Park's death. This expedition was, however, fatal to the

enterprising and successful traveller; but his mantle fell on his servant, Richard Lander, who with his brother John left the coast of Guinea in the spring of 1830, and early in the summer reached the Niger, and traced the course of the river to its embouchure in the Bight of Benin. The channel by which they reached the sea was known to the Portuguese by the name Nun, to the English as Brass River. The extensive delta of the Niger was now indicated by the numerous mouths by which it communicated with the Bight of Benin. The confluence of the Chadda was also observed; but the light canoes in which the brethren made their adventurous voyage were unfit for its ascent. In this expedition they were taken prisoners, and narrowly escaped being sold as slaves; in a subsequent one, Richard Lander perished in a skirmish with the natives. Two years after, an association having been formed for the purpose at Liverpool by Mr. McGregor Laird and others, two steamers were fitted out to explore the Niger: they reached the Nun in the autumn of 1832, and from the lateness of the season suffered severely from sickness. In the year following Mr. Laird returned, and Mr. Oldfield, with Lieutenant W. Allen, explored the Chadda, which was not found to flow through so rich or fertile a country as the Niger, though large commercial cities were found on both.

During this time two expeditions had been made from the north and west. Major Laing crossed the desert from Tripoli to Timbuctu in 1826, but was murdered as he was proceeding westward. René Caillie, a Frenchman, one of the most fortunate of African travellers, succeeded in reaching Timbuctu in 1828 from the coast of Senegal, and from thence travelling northwards arrived at Tangier in safety.

The southern promontorial extension of the continent had hitherto remained almost unknown.\* In the middle of the seventeenth century the Dutch had formed a colony at the Cape of Good Hope, and the Boers in search of pasturage had penetrated as far as the Sniewberge; and from Robben, who wrote in 1706, to Sparrman and Le Vaillant, as well as subsequently, after the conquest of the colony by the English, from Barrow, we have accounts of that country and its inhabitants, whether Kaffirs or Bosjesmans, as well as its natural productions. It was not till the commencement of the nineteenth century that the Sniewberge range was passed; and Messrs. Trotter and Somerville discovered the Orange River and visited the capital of the Bechuanas. Dr. Lichtenstein and Dr. Burchell also gave most valuable accounts of those people and their country; but Dr. Campbell, a missionary, passed through it, and attained a more northern limit, which was in 1835 exceeded by Dr. Andrew Smith, who penetrated as far as the southern tropic, and explored the source of the Orange River.

The displacement of the Kaffirs by the Zulu tribe led to the knowledge of the Natal district, and to the emigration of Boers into it. To Captain Gardiner and his followers much of our knowledge of this country is owing; indeed, of late years English missionaries have done more to open the interior of Africa than any other persons. Of the coast, however, our knowledge is based on Captain Owen's surveys; but in 1837 Sir J. Alexander penetrated on the eastern side into the territories of the Damaras, as far as the river Kuisip and Walvish Bay under the southern tropic. In the same year Mr. Holroyd and Dr. Rüppell visited the provinces of Semen, the Tacazzi, with the Blue and White streams of the Nile, the former penetrating into the desert of Kordofan; he was followed by MM. Ignaz Palmé and Russegger; while M. d'Abbadie explored Abyssinia, a knowledge of which country was further obtained by MM. Dufoy and Aubert, as well as M. Rochet d'Hericourt; and still farther by Dr. Beke; while MM. Lefevre, Petit, and Dillon gave

\* B. Diaz in 1492 discovered, and Vasco de Gama in 1496 doubled the Cape.



itineraries in Tigre; the Baron de Wrode visited Shoa; and in 1841 Major Harris explored that country on a mission from the government of British India; Messrs. Arnaud and Sabbatier, under the auspices of the Pasha of Egypt, ascended the White Nile; and Messrs. Krapff and Isenberg, missionaries, penetrated into the heart of the kingdom of Shoa.\*

In 1841 a great attempt was made to explore the river Niger, by steam-vessels, from its mouth. This expedition, however, though conducted, as was supposed, under every possible advantage by Captains Trotter and Allen, did not succeed in ascending as high as the previous expedition of Lander and Becroft; but the following year Captain W. Allen, in one of the vessels belonging to the expedition, explored the Cameroons or Dualla River and the Bay of Amboises, or Ambas. In 1845, Mr. Cooper Thomson journeyed from Sierra Leone to the country of Futtah Jallo; and Mr. Duncan from Cape Coast to Whydah, and thence to Dahomey and Abafudiah.

At this time attention having been drawn to the eastern coast by the labours and researches of travellers in Abyssinia, and scholars at home—among the latter, especially Mr. McQueen and Mr. Cooley—Mr. Leigh visited the mouth of the Zambeze river, and Lieutenants Barker and Cruttenden the north-eastern horn of Africa, the ancient Regio Cinamomifera; and in 1849, David Livingstone, a missionary, with Messrs. Oswell and Murray, reached Lake Ngami, in  $20^{\circ} 20'$  south lat., subsequently discovered another large lake, 200 miles to the north-west, and pushed their researches as far as  $17\frac{1}{2}^{\circ}$  south lat.; while Messrs. Rebman and Kraff, starting from Mombas, described two mountains covered with perpetual snow under the same parallel to the west; on the south, M. Gassiot explored the country to the east as high as the Limpopo; and Mr. F. Galton proceeded towards Nourse river as far north as Odonga in lat.  $18^{\circ}$  south on the west coast; he further explored the country to the 21st meridian east long., while Livingstone had reached  $26^{\circ} 50'$  on the same parallel, and Stanislas Magyar, a Hungarian, had arrived still nearer the Equator; Mr. Andersson, extending the exploration of Mr. Galton, crossed the country to Lake Ngami; but it remained for Livingstone, following the track of native traders in slaves, to cross from the Atlantic to the Indian Ocean. In the north, Richardson, Overweg, Barth,† and Vogel, with Church and Macguire, have traversed the countries north, west, and south of Lake Chad, traced the course of the Niger already explored by Park, and extended Denham's route to Yola on the Chadda. Drs. Baikie and Hutchinson with Mr. May have successfully ascended the Niger and the Chadda.

2 *Information to be Expected.*—The existence of mountains covered with perpetual snow, to the south and east of the head waters of the Nile, would seem, if correct, to confirm the accounts of ancient geographers, and lead to the conclusion that the watershed of the continent of Africa is better defined than has hitherto in modern times been supposed.

It may be assumed, without hesitation, that the centre of the promontorial southern extension of the continent is a vast basin, imperfectly drained, occupied by lakes, marshes, &c., and producing large rivers, especially towards the east. This basin, surrounded on the east and south by the earlier rocks, appears to be on the west shut in by ranges of moderate elevation and later origin; these connect with the Kong Mountains to the north which seem to continue their trending west and north, to join the Atlas range, and then surround, to the west, another basin, though of different character to the southern, being arid and barren for the most part. What we have yet to

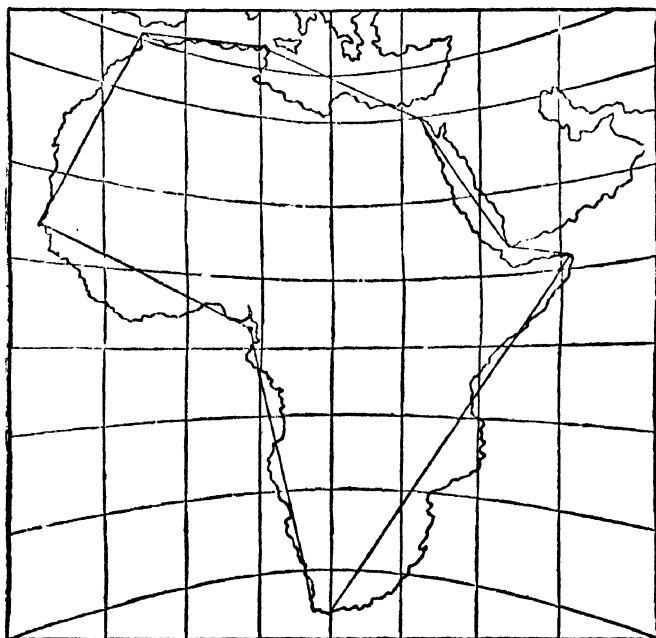
\* A detailed account of all expeditions to Abyssinia and Shoa, previous to that date, will be found in the President's Address to the Royal Geographical Society for 1844.

† Barth also reached Timbuctu, but made no astronomical observations.

learn of the general features of this singular portion of the world's surface, is the line of separation between these basins; and probably this is not difficult to determine from the general outline of the continent, and by analogy with other continental masses.

The great eastern horn of Africa would suggest the extension of spurs from the principal watershed in that direction; the great lateral extension of the continent on the north, and the knowledge of the parallelism of the Atlas and Kong Mountains, would leave us little doubt that as one so the other must be connected with the principal watershed by perhaps lower, but still continuous elevations; and from these considerations, as well as from the considerable altitude attained by mountains on the coast near the Bight of Benin, it may be assumed that a well-defined watershed of very considerable elevation separates the southern and northern basins, and connects the ranges of the eastern and western coasts. This, if found correct, will give new interest to Africa in its physical relations with other parts of the world; but whether it be so or not, at any rate we know enough to see that the map of Africa must be entirely re-constructed.

3. *The Boundaries and Limits.*—Africa is bounded on the north by the Mediterranean Sea, on the east by the Red Sea and Indian Ocean, and on the west by the Atlantic; it is united to Asia by the Isthmus of Suez, in breadth about seventy miles, and approaches, at the Strait of Gibraltar, within twenty miles of the south-western point of Europe, and about the same distance from the south-western point of Arabia, *i. e.* Asia. Cape Palmas is distant from Cape St. Roque, the nearest point of South America, 1759 miles; the Cape of Good Hope is distant from Cape Horn 3591 miles; and Cape Agulhas from Tasman's Head, Van Dieman's Land, 4576; Cape Guardafui from Cape Comorin, 1567. It may be as well to add, in consideration of the great eastern continent as a whole, that the Cape of Good Hope is distant from North Cape 6364, and from Cape Navarin 8970 miles.



The angles of the normal figure of Africa corresponding so nearly with

the extreme points of the continent, no comparison is needed; the latitude and longitude of these are as follow:—

Cape Guardafui . . . . .	11° 50' north, 51° 16' east
Cape Agulhas . . . . .	34° 49' south, 20°     "
Cape of Good Hope . . . . .	34° 22'     , 18° 29'     "
Fernando Po . . . . .	3° 48' north, 8° 43'     "
Cape Verd . . . . .	14° 43'     , 17° 34' west
Cape Tangier . . . . .	35° 47'     , 5° 48' east
Cape Bon . . . . .	37° 4'     , 11° 3'     "
Suez . . . . .	29° 58'     , 32° 34'     "
Bab-el-Mandeb . . . . .	12° 41'     , 43° 27'     "

The superficial area of Africa, as given in the portion of this work devoted to *Physical Geography*, is 10,550,000 miles, the mean 11,048,000.

4 *The Coast Line*.—The intersection of the lines forming the eastern coasts of Africa makes an angle of about 30°; the coast of the Red Sea trending south and east, and that of the Indian Ocean south and west; from the Cape of Good Hope to the Cameroons the direction is nearly north north-west, from thence nearly west to Cape Palmas, from which it describes nearly an arc of a circle to Cape Non, thence north and by east to Tangier, east and by north to Cape Bon, east and by south to the Isthmus of Suez.

The proportion between the area and coast line, according to Professor Ansted's calculation, would be 811; according to Professor Guyot's 623; between the normal figure and the coast line only 1037. The principal projections and indentations of the coast are at the eastern angle, which, measured on the shore of the Arabian Gulf to Cape Guardafui, is 8°, or 480 geographical miles; the Bight of Biafra about 3°, or 180 miles; and the Gulf of Gades, which, measured from Cape Bon to the south-western angle, is about 4°, or 240 miles.

The linear extension of Africa is, from Cape Agulhas to Cape Bon, 4342, and from Cape Verd to Cape Guardafui, 4008 geographical miles.

5 *The Watersheds*.—The lines of the watersheds of Africa have already been faintly sketched, and, excepting on the north-west and south, there are as yet no materials for more definite description of them.

On the coast of the Red Sea the Arabian chain, extending along the lower course of the Nile parallel to the Libyan chain, the buttress of the Great Desert, may have a general elevation of about 4000 feet, and culminate about 6000; the elevation of Meinfayah, near the centre, has been given as 5946 feet above the sea. To the south of the Red Sea the elevation increases, near the strait of Bab-el-Mandeb, the culminating point, Alequa, being given as 10,308 feet above the sea; and in the interior, about the sources of the Atbara, it is still more considerable, Abbajaret being estimated at 15,000 feet; between these mountains and Kilmanjaro and Kenia, supposed to reach 20,000, there may probably be a depression, but the central chain, of which they are the outlying or projecting peaks, cannot, it may be supposed, be less than 15,000 feet in elevation; nevertheless of the mountains on the eastern coast, as yet, we cannot be said to have any satisfactory information.

On the south, the principal range is the Sniewberge, which culminates in Spitzkop, at 10,250 feet above the sea. Table Mountain at the southern extremity has an elevation of 3582 feet, and projects in the Cape of Good Hope, which rises 1000 feet from the sea; while several distinct ranges form buttresses to vast terraces, rising gradually to the principal elevation, the longer slope being to the north.

Of the mountains of the western coast of the promontorial extension of Africa, we know as little as of those of the east; but the culminating point of the Cameroons mountains, about the river of that name, falling into the Bight of Biafra, is said to reach an altitude of above 13,000 feet; it may be supposed, therefore, that these, and the mountains of Lupata, on the south and east, are spurs from the central elevation, indicated by the supposed snow-covered peaks west of Mombas; and the former may be the nucleus of the

coast ranges, which, continued to the west in the Kong mountains, are not unlike those of the Cape of Good Hope in character; many of the peaks are said to reach the snow line, and cannot, therefore, have less elevation than 15,000 feet. Nor, indeed, is the chain of Atlas, so much nearer home, very much better known; the more elevated portions are to the west, and it appears to run in parallel lines, united by transverse spurs, from Cape Nun to Tripoli, and may be considered as connected with the Libyan system of Egypt; secondary ranges extending on the west through Algeria to Cape Bon, and on the east through Cyrene to the opposite angle of the Syrtis. This chain culminates in Morocco at 12,780 feet, not, indeed, reaching the snow line, but having an elevation as compared with it, according to that of the Carpathians, Apennines, and Corsican mountains; it may well, however, turn out on further examination, that higher elevations have yet to be discovered. Of the mountains of Senegambia, and of those which form the watershed between the Senegal and Niger rivers, and extend in the peninsula of Sierra Leone, nothing is known; they probably form the connecting link between the Atlas and the Kong ranges: from the size and character of the rivers which flow from them, their elevation should be considerable.

6 *Orographical Classification.*—With so little information as we possess as to the extent, continuity, or elevation of the mountain ranges of Africa, it would be useless to attempt any orographical classification. It may however be remarked with reference to the entire eastern continent, that as the divided ranges of the primary mountains of Asia seem to collect in the primary ranges of Europe to the north, and to the south in Africa, the secondary ranges of Egypt may in like manner unite in a central watershed, which separating again to the west may, by its spurs, surround the Great Desert, and on the south be continued in the coast to the Cape of Good Hope.

7 *Classification of Rivers.*—As the classification of rivers, according to the system hitherto pursued in this work, depends on and results from the classification of the watersheds, and the one is impossible to our present amount of knowledge, the other must be also.

In reference only to Africa, considered separately and not as a division of the eastern continent, the Nile might be considered a primary river, as possibly might some of the rivers of the north-east coast and those which flow into Lake Chad from the south and east; while the Senegal, Niger, Zambeze, Coanzo, Congo, and Orange rivers would all be secondary, as would the smaller streams which lose themselves in the Sahara; while those of the Gold Coast, Benguela, &c., would perhaps be tertiary; as these latter are small, and as the only primary river of any consequence is the Nile, if even that is to be so esteemed, the hydrology of Africa is characterized by the importance of its secondary streams, differing in this from Europe on the one hand, and from Asia on the other. This inference, as well as that drawn from consideration of the orography, seems borne out in a great measure by that which follows.

8 *The Geological Formation.*—This seems as simple as the outline, if we are entitled to form an opinion of the whole from the parts which we are acquainted with. These are principally Egypt, Abyssinia, the Cape colony, the Atlas and its subordinate ranges; and from our knowledge, slight as it is, recently indeed more enlarged with reference to Egypt and the southern extremity, it may be concluded \* that 'the oldest rocks (whether crystalline, gneiss, or clay-slate, here and there penetrated by granite) form a broken coast fringe' around the Cape colony from east to west, are surmounted by sandstones of the Silurian system, and these again overlaid by carboniferous strata: all dipping inwards as to a central basin. The older crystalline rocks also extend through Abyssinia from the coast of the Red Sea, and cross the valley of the Nile below Nubia; on these limestones rest, and form the eastern limit of the valley of that river; while to the west sandstone predominates, but surrounding some of the oases, limestone presents itself, and its pre-

\* Sir R. Murchison's Address to the Geographical Society, 1852.

sence may account in some measure for their fertility. In the Atlas as well as the Kong range, argillaceous rocks seem to predominate; but as in the east, whether to the south or north, so in these the earlier rocks will doubtless appear, and the eruptive rocks be found obtruding through fissures in the more recent strata. On the east between the Limpopo and Zambeze granitic rocks predominate, and near the latter basaltic rocks are found. As the geological character of the countries on either side of the Red Sea is analogous, so no doubt it is in those opposed to each other at the Strait of Gibraltar: both peninsulas, Arabia and Spain, may indeed be considered as physically African, rather than European or Asiatic; although it must not be forgotten that districts of similar character extend along the southern coast of the latter continent, and even across the valley of the Indus.

## CHAPTER XXIV.

### THE NILE.

§ 1. The principal watershed.—2. The secondary ranges of the west.—3. The sources of the Nile.—4. The valley of Egypt.—5. The Delta.

*THE principal Watershed.*—To the slight sketch which has already been given, but little can be added. The limestone ranges extend from the Isthmus of Suez to the cataracts of the Nile, where the primitive rocks are found, especially the well-known Syenite, but between these is a district of recent sandstone; the extreme northern limit, from whence the limestone ranges trend towards the isthmus, is Jeb-el-Mokattam; these present to the valley abrupt precipices, rise in rugged and broken masses, in some places 2000 feet above it, and are intersected by deep transverse ravines.

In the district between the Nile and the Red Sea, the centre is an elevated plain, the slope to the latter being one-third longer than that to the former, in about lat. 28°. Granite and other primitive rocks appear between the limestones of the coast and of the river valley, and pass into the interior; the highest peak here is El Ghorib, rising 6000 feet, and composed of primitive rock, to the south of which the Jeb-el-Munum Fiyah has an elevation of 5000. Sir Gardner Wilkinson represents both the sandstones and limestones as resting on clay; but this probably applies to the western districts alone.

The Abyssinian mountains rise by three successive terraces from the Red Sea, and attain an elevation of not less, possibly more, than 12,000 feet; a large portion of them are of schistose formation, and the eruptive rocks are frequently protruded in the mountains of Tigre; the superincumbent strata are much distorted, and generally have an abrupt and precipitous appearance. They are however in many places covered with verdure, and in this as in the former, they assume considerable resemblance to those of southern Asia. The mean elevation may be above 8000 feet; the mountains to the south have, however, as already noticed, a greater elevation, Abba Jarrat rising 15,000, and Mount Buahal 14,364 feet.

2 *The Secondary Ranges of the West.*—These, like the extension of the principal range to the east, are of limestone and sandstone, presenting a short slope, or rather an abrupt escarpment to the valley of the Nile, and extending into the Great Desert at a very inconsiderable angle with the horizon, though the surface is diversified by slight elevations and depressions. The superficial strata seem to have a thickness of about 100 feet, water not being found at a less depth.

Passing to the north-west through ancient Cyrene, these ranges, increasing in elevation, enclose isolated but most fertile valleys, which seem to correspond not slightly with the oases of the desert. Here, apparently, the continuity of

the chain of mountains is broken ; but to the west it is renewed, and extended into the ranges of Atlas, as already noticed.

The parallelism and precipitous character of the ranges on both sides of the Nile valley give it the appearance of having been formed by disruption.

3 *The Sources of the Nile.*—These are principally two ; but one of these at least owes the fulness of its waters to the junction of several streams. The Bahr-el-Abiad, or White River, is by most geographers considered as the more important, possibly because its sources are unknown ; it should, however, according to the theory adopted throughout this work, be the secondary source, rising in the depression between the primary and secondary chains of mountains : and Mr. Cooley, in his work on ‘Claudius Ptolemy and the Nile,’ gives sufficient reasons for this conclusion. The results of the expeditions sent to examine this river, by the Pasha of Egypt, as well as by missionaries, lead us to suppose that in its middle course it forms a succession of extensive marshes, stretching from west to east ; but that after being joined near the tenth parallel by a considerable affluent from the east, where its course becomes northerly, its stream is deeper and more rapid, occasionally spreading to a mile in width ; the navigation is, however, interrupted by sandbanks, which form a bar at its mouth, where it is about 500 yards broad ; its confluent stream, the Blue Nile, being nearly 800, with a greater volume, and more rapid flow of water.\*

The sources of the White Nile seem to lie in the mountains of Komberat, from whence it has an easterly course, and flows through a rocky channel, broken by cataracts.

The Blue Nile, Bahr-el-Azrek, is a stream of altogether different character. Strong and impetuous throughout its course, it overpowers the waters, and has thrown up a bank of sand across the mouth of its confluent stream ; in its upper course it is called Abai or Abawi, and after flowing through Lake Dembea or Tsana, assumes that by which it is better known. This lake, lying in about 12° north lat., and 37° 15' east long., may have an area of 1200 miles ; its length from north to south may be above fifty miles, and its breadth about half its length ; its elevation above the sea is 5750 feet ; it contains several islands ; on the south and east the mountains which limit its basin rise 12,000 feet above the sea, to the west not probably more than 9000, and the sources of the Blue River are in a marshy plain ; below this portion of the watershed of its basin probably, however, other streams may be found to flow into the lake, on leaving which the Blue River is 200 yards wide ; but soon narrowing, the waters descend in a series of falls through a cleft in the volcanic rocks, so rapid in declivity, that at fifty miles from the sources of the river it is said to be 6000 feet below them, while its course among the mountains of Abyssinia must be more than 500 miles, during which it receives numerous affluent streams, especially from the mountains on the right ; in its lower course it has a considerable affluent, the Jabous, probably the same as the Maleg of the Portuguese, and the Dedhesa of Dr. Beke.

The point of confluence is in 15° 34' north latitude, and 32° 30' east longitude ; from thence the river trends northward, and rushing through a narrow gorge between mountains of but little elevation, bends again to the east, and flowing through extensive plains, receives a considerable affluent, the Tacazze, or Atbara, the ancient Astaboras ; from the right this river has more than one source in the mountains of Larta, and flows through the country of Tigro in a general north-west direction, joining the main stream in 17° 45' north latitude, which, from thence to the Mediterranean, a distance of 1350 miles, has not another affluent, a remarkable but not altogether singular case among rivers, as has been usually asserted.

The great bend of the Nile, which commences at Assouan, the ancient Syene, nearly under the nineteenth parallel, assumes first a south-westerly

\* It should, however, be noted, that a conflicting account gives the White Nile a depth of from three to four fathoms, and a breadth of from three to four miles above the point of confluence.

direction for 120 miles, and then trends north-west for as many more; throughout this course it flows in a narrow channel; and to the south of the twentieth parallel falls over a ledge of granite rocks, forming what is known as the third cataract or rapid; from hence to the second is in direct distance about 130 miles, and from thence to Philæ, where at the first cataract the lower course of the river commences, about 150; throughout this middle course the banks of the river are either formed of the rock which limits its valley, or of sand extending to the rock, and consequently incapable of supporting vegetable life, nor, indeed, is the course of the river very dissimilar in character below this first cataract.

4 *The Valley of Egypt*.—It has already been noticed that the valley of the Nile appears like a cleft in the mountains; in no case is this of greater breadth than about ten miles; while in the upper districts of Egypt it is much less. Throughout the entire length of the valley, accumulations of sand have formed strips of desert country at the base of the ranges by which it is limited, and these being above the head of the water, even during inundations, do not afford opportunity for the labours of the husbandman. On leaving the granite district which indicates the edge of the Nubian Desert, the river divides and forms several islands; of these, Elephantine is the largest and the last; its position has always given to this island considerable political and commercial importance. Formed of granitic rock, it owes the abundance and beauty of the vegetation which has obtained for it the name of the 'Isle of Flowers,' to the alluvial deposit with which the waters of the river, during their rise, have covered it; it is nearly one mile in length, and a quarter in breadth, and is, excepting at the southern extremity, covered with gardens interspersed with mulberries, acacias, dates, and sycamores; at the south point the bare rock rises above the river, and as this island was the favourite quarry of the ancient Egyptians, it is more than probable that its present fertility is the result of the reduction of its original level by the transfer of its rocky surface to the temples, sepulchres, and pyramids of Lower Egypt.

Of the fertile districts of the Nile valley, that of Faioum or Faïum, more properly Phiom, *i.e.*, the Lake, is the most remarkable; it has not unaptly been named the Garden of Egypt. Situated on the edge of the Nubian Desert, under latitude  $39\frac{1}{2}^{\circ}$ , it is still subject to the inundations of the river; Lake Mœris was formed by gigantic embankments extending across the valley; these have recently been discovered and surveyed by Linant, the lake El Quorn, or Birket el Quorn, formerly supposed to be Lake Mœris, seems to have been used to receive the overflow of the lake. The Bahr El Jusuf, or Canal of Joseph, extends from the Delta southward for above 150 miles, and is connected with the lake at Faioum, and numerous other canals intersect the country in every direction where irrigation is possible.

The characteristic vegetation of the valley of the Nile is found in the cereals, gourds, and leguminous plants; of trees, the acacia, date palm, and sycamore; the papyrus and lotus among the water plants. Of animals, the most characteristic of the country are the crocodile, hippopotamus, buffalo, and jerboa; of birds, the vulture, stork, pelican, and ibis; quails are very numerous; the insects of this country are still its plagues, especially the locust and mosquito; bees also abound, and their products are of much importance in the social economy of the inhabitants.

5 *The Delta*.—That any difference of opinion respecting the origin of this vast alluvial deposit should exist, appears not a little singular. That it has been formed like the deltas of other rivers, which have derived their names from this, cannot for a moment be doubted; and although here as elsewhere (as already recorded of the valley of the Indus), local and temporary alterations may have been the result of earthquake action, or other causes, yet the constant increase and extension of the land about the mouths of the Nile must be mainly, if not entirely, attributed to the action of the waters of the river, especially during the inundations. The apex of the Delta is in lat.  $30^{\circ} 7'$ , from which point to the sea its length is about ninety miles, and it may

have about the same breadth. As in other deltas, so in this, the channels by which the waters of the river connect with the sea have frequently changed; the eastern and western branches, *i.e.*, those of Damietta and Rosetta, being in breadth 800 and 1800 feet respectively, are now the most important; those of Bourlos and Dibe less so. Even the Indian accounts give the site of Memphis as the original limit of the valley and the shore of the Mediterranean, and all below that point may, in the language of the Father of History, be well termed the gift of the river. The depth of the deposit varies from thirty feet at the extremities, to six inches. From the first cataract to the sea the average fall is two inches to a mile, and the mean velocity of the current three miles an hour; the annual rise of the waters, due to the periodical rains and melting of the snows on the Abyssinian mountains, commences in June; in September the whole delta is submerged, and in November the inundation has subsided. The rise of the water in Upper Egypt may be estimated as on the average thirty feet; in Lower Egypt as twenty-four.

The shore of the delta is lined with lagunes characteristic of such formations, like those of the delta of the Po; a bank of sand, thrown up by the action of the sea waves, first creates lagunes, gradually turns them into lakes, which in process of time become filled with the deposit which can no longer be carried out to sea. The principal lagunes of the Nile delta are those of Menzaleh Bourlos, Etoko, and Maraotis; the former, which receives the waters of the Pelusiatic and Tannitic branches of the Nile, is fifty miles long and nearly one-half as broad, but very shallow; its fisheries are still famous.

To the west of the delta are the famous Natron lakes; these, eight in number, are situated in a valley to which they give name among the secondary ranges at the edge of the Libyan desert; they abound in crystallizations of natron, or carbonate of soda and sea-salt.

## CHAPTER XXV.

### SOUTHERN AFRICA.

- § 1. Watersheds of the south.—2. Rivers of the south and west.—3. Rivers of the south and east.

**WATERSHEDS of the South.** — South Africa has already been described as a country of terraces buttressed up by continuous mountain-ranges, trending, for the most part, in the same direction as the coast. These terraces rise gradually from the sea to the summit of the ridge known as the Roggeveld, Niewveld, Sniewberg, or Stormberg mountains, which, continued to the north and east in the rugged ranges of the Mathlamba or Quathlamba and Drachensberg, pass into those of Mozambique, the ancient Lupata, or back-bone of Africa; but the greater volume and more constant supply of the waters in the river of Natal, would lead to the conclusion that the main watershed of the central portion of Southern Africa lies far to the west, and that, therefore, a considerable depression exists between the mountain ranges of the south and the principal watershed, the outlying peaks of which appear, as already noticed, near Mombas.

The mountains generally present a steep face towards the south, but slope gradually towards the interior, so much so, indeed, that even on the northern side of the highest range the elevation of the mountains is not perceptible. The culminating points are most probably to be found near the sources of the Orange River, attaining, probably, to an altitude of 12,000 feet; the Compass Berg, in Graaf Reynet, rises 10,250. The Orange River district forms an elevated plateau, which slopes gently "from the summits of the Mathlamba range into the Kabhini desert, and the barren plains of the Bushman



Karoo, and the granite wastes of Namaqua land," while to the eastward it gradually changes into undulating grassy plains, which, as they approach the coast, and become well watered, are covered with luxuriant vegetation.

In journeying from the Orange River to Natal, the traveller arrives suddenly and unexpectedly on the edge of the Drachensberg, looking down on the Natal colony, 5000 feet below him; and so, in passing from the Roggeveld, he as suddenly overlooks the Great Karroo, from which the peaks of the Winterhoch and Zeuerbergen do not appear of more than half their proper altitude.

The summit level, passing along the ranges already named, may be estimated at from 7000 to 8000 feet above the sea; and to the south, between it and the Roggeveld, Niewveld, Zwartbergen, and Cold Bokkeveld ranges, which culminate to the east in Compass Berg, already mentioned as attaining an elevation of 11,200 feet.\* The northern branch of this range, taking a semi-circular sweep, and joining the Stormberg, passes off to the north-east, while a southern spur approaches the coast, forms the ranges known as Zwagenhoch, Boshberg, Winterberg, Katberg, and the Amatola and Buffalo heights, and finally is lost in the rugged coast district of Kaffraria. These ranges culminate in the Great Winterberg, at 7610 feet above the sea. The average height of the plateau which they enclose may be 2500; here are the fertile valleys of the Sniewberg and Zwagenhoch, the head waters of the Great Fish River, the Kat, and Burneen rivers, and further east, at a higher level, the North Victoria: on the west, the Great Karroo extends its surface of red clay, thinly covering a substratum of blue clay slate, diversified by irregularly interspersed elevations, and intersected by abrupt hills and ridges. To the south of the Cold Bokkeveld is a plateau of greater elevation than the Karroo, but not of great extent; in the same line, other similar small plateaux of considerable elevation are found, and to the south of these is a narrow plateau, not extending more than twenty-five miles in breadth, and gradually narrowing to the eastward into a mere step or terrace; its limits are the Great Swartzberg and Winterhoch, which extend westward and southward in the mountains of the Cardon pass, the Drachenstein, Zondevend, Langeberg, and Outeniquas mountains, which gradually subside towards the ocean at Plattenberg bay: here are the sources of the Oliphant, Warm-Bokkeveld, and Boschveld rivers.

The southern and lowest plain is a marshy, level tract of sand, broken by fertile valleys, as at Caledon and Swellendam, and the Outeniquas land; here is also the forest of Zitz Kamma, and this plain extends between the coast and Buffalo range into Kaffraria; in Natal it is limited by the Roodeberg, and there, and in the Zulu country, spreads out into a rich champaign of the highest agricultural capability. The upper plateau is drained, as has been noted, by the Orange River and its numerous tributaries; and these, in their upper courses, are plentifully supplied with water, but in the lower, often for years, present nothing but chains of pools.

It must not, however, be supposed that all these plateaux are irretrievably barren and desolate, on the contrary, the watercourses are fringed with willows, and the verdure of all is most luxuriant; and the lengthened north-east slope from the western watershed presents fine prairie land. After heavy rains even the Great Karroo evinces the fertility of the greater portion of its surface in rainy seasons; it has, however, tracts entirely destitute of water, and, therefore, at first irreclaimable by man. Deserts also are found on both sides of the Orange River, but the eastern districts are generally fertile.

Forests are not found in the west; in the south, the Zitz Kamma, in the district of George the cedar woods on the Cedar Mountains, and on Largeberg, are all that can be noted. The Tsi Kamma forests are very extensive, and

\* From the height of this mountain it might be supposed that the superior range has an elevation of not less than 15,000 feet, unless, indeed, it be the nucleus from whence the various chains diverge.

the kloofs of the Mulesberg, Boschberg, and the Amatola mountains are well wooded, and afford valuable timber, as do the forests of Kaffaria; but in all cases these are only found on the southern, or coast escarpments of the mountains, the interior and more gentle slope being invariably destitute of timber, unless the willows skirting the principal watercourses deserve that name; and this is the case with the principal grazing districts, as Beaufort, Graaf-Reynet, Colesberg, Albert, and the Orange River sovereignty.

Of the mountains of the south, the Sniewberg may be taken as a type: it is formed principally of sandstone strata, lying in nearly a horizontal position, and thus presenting, on the southern escarpment, the appearance of a gigantic wall of Cyclopean architecture, an appearance remarkably developed in the Oudebergen, where the rock appears at the top, rising about forty feet, like a low tower or bastion; the portion of the Sniewberg, however, which is denominated Kakaberg, is broken into beautiful valleys, covered with grass, and interspersed with clumps of forest trees, among which many rare and beautiful birds are found.

A distinction is, however, observable between the sandstone and sedimentary rocks and the granitic ranges: the former are, however, the characteristic features of the orography of Southern Africa; the latter prevail on the Khamies, Paarl, and Blue mountains, as well as on Lion's Head and Table mountains.

2 *Rivers of the South and West.*—The most important river of the southern extremity of Africa, is the Orange, or Gariep, which rises in the Mathlamba range at a considerable, though unascertained, elevation. As this range attains an altitude of 10,000 feet, the sources of the river are not probably of less elevation than 6000; in its upper basin, the streams are confined within very narrow channels, and it is here called the Black River, from the colour of its waters; it flows in a south-westerly direction through the valley formed by the ranges of the Mathlamba for more than 100 miles, receiving the affluent waters of numerous mountain torrents, and issuing by a narrow pass, is increased by the waters of the Kraai, and then, trending west and north-west, by those of the Caledon, about 250 miles from its source. To this point it is known as the Nu Gariep, and here the river is 930 feet broad, but only two and a half deep, and flows in a channel the banks of which rise twenty-five feet.

The Caledon, or Mogokarre, is a rapid stream, and in summer its waters are on a level with the banks, and often twenty feet deep; it attains a breadth of 300 feet, and receives some considerable affluents. Of these, the Tlotse, and Saule, or Little Caledon, deserve notice; the latter, called by the natives Putiatsana, possibly the Antelope River, rises from two sources in the Basutos country; its waters are pure and limpid, their bed being very hard; it is noted for the peculiar fish inhabiting its waters. The Caledon is more than 200 miles in length, and its waters vary in colour from yellow to brown, and even deep black.

From the junction of the Caledon, the Gariep flows for 150 miles in a north-westerly direction, and receives the Ky Gariep, known also as the Yellow or Vaal river, from the north. This river has also numerous affluent streams from the south: the Wilge; the Eland, a fine clear stream, flowing in a rocky bed in which pebbles are abundant, especially agates; the Mull, and the Liebenberg, all rising in the Wittenberg mountains; also a wide and rapid, but usually fordable tributary, the Mooi, which winds through an extensive valley. The Vaal is also called the Likwa, and from its junction the river takes a south-west direction, receiving the waters of the Rhinoster, Vals, Boralla, Zand, Vet, Hart, and Riet; from the mouth of the Vaal to the sea may be 550 miles. Lower down the river, in its westerly course, three streams unite on the left: the Visch or Hartebeest, the Zac, and Great Riet, which have their rise in the northern slopes of the Niewveld and Roggeveld mountains; and on the right the Fish Borradaile Oanop or Oup, flows through the Namaqua land, rising in

mountains which, though attaining an elevation of 5350 feet above the sea, are to the east of the western watershed.

In addition may be mentioned the Makaling, or River of Aloes, which, flowing from north to south, is a tributary of the Orange River; and the Nama-gari, which may, perhaps, be esteemed the principal source of the Vaal; it receives a considerable affluent, the Enketuane, from the south, and from the point of junction changes its original brown colour to the yellow which gives name to the Orange River, and which is derived from the sand which is brought down by its upper waters and mixed with the calcareous formation through which it has its middle course. The Sea-cow river is important as collecting the waters of the northern slopes of the Sniewberg and Roodberg, although it is rather a chain of enormous and very deep pools connected by canals than a river; its banks are covered with reeds, and abound in game.

The Orange River, especially in its middle and upper course, is broken into many beautiful falls, and is remarkable for the fertility of its banks; the upper course is through rugged mountains, the lower through arid plains, where its course is marked by the willow and mimosa trees which fringe its banks; its length must exceed 100 miles. Agates, opals, cornelian, and jasper are found in abundance in its bed. Its lower course is also obstructed by falls, and its mouth by a bar, which make it entirely useless for commercial purposes.

The next important river of the east is Oliphant River, which rises in the southern extremity of Cedarberg; this is by some considered as more properly to be called Elephant River: it has a broken and irregular course of about 150 miles, but is never deficient in water, and can be navigated by small craft for twenty miles from its mouth; it has several considerable affluents, the most important being the Hantam and Doorn.

The Berg river flows from the north of Cape Town into St. Helena Bay; its volume of water is so considerable, that until lately it was crossed by a floating bridge.

3 *The Rivers of the East.*—Of these the first is the Breede, which, falling from the southern slope of the Warm Bokkeveld, the watershed of the Oliphant River, in its upper course runs parallel to the Berg; its affluents are the Kex and Zondereinde; it is a considerable river, but its navigation is impeded by a bar at its mouth, but this has never less than twelve feet of water, and the river is accessible for vessels of that draught for forty miles from the St. Sebastian Bay.

The Guaritz drains a large area; it has its principal source, the Gamka, in the Niewveldberg; this has a considerable volume of water, and is remarkable for the beauty of the flowers found on its banks. It is joined by the Oliphant River on the left, and lower down the united streams receive the Taw from the right; it is a weak stream in summer, but in winter is rapid, and considered very dangerous. One of its affluents, the Dwyka, *i.e.*, mouse-coloured, is so named from the grey sand which forms its banks; it has not much water, but is about 100 yards in breadth.

The Gamtoos or Kamtoos also rises in the Niewveldberg, but has its eastern source, Buffalo River, in the Sniewberg; it is a considerable stream, and navigable, but a bar, dry at low water, obstructs the mouth. The Buffalo or Buffeljagt is a deep and rapid stream, flowing over a stony bed; its banks are clothed with acacias.

The Bushman River rises in the eastern slopes of the Compassberg, and falls into Alysa Bay; it is a considerable river, but receives no affluents of importance; the scenery of its valley has been thought worthy of notice.

The Great Fish River rises in the eastern spurs of the Sniewberg; it has a tortuous course, but its affluents are not considerable: one of them, the Brak, is, however, a considerable stream, and often impassable, and being obstructed by a bar of shingle at the mouth, spreads into a considerable lake: the quantity of water which this river presents is very variable, at one time it is little better than a string of pools, at another it has risen seventy feet;

like the other rivers, it has a bar at its mouth, but there is never less than seven feet of water upon it. The banks of this river, formed of stiff blue clay, descend gradually from the elevated plains on either side; on the east it is fringed with wood; there are hot and petrifying springs on the right bank; its course may be estimated at nearly 250 miles.

The Keis Kamma has a course of about seventy-five miles, and its entrance is impeded not only by a bar, but by the surf which beats over it, and the rocky reefs which extend from it.

The Kei rises in the western slopes of the Stormberg; it may have a course of 150 miles; it has two affluents of the same name. Passing northward the short slope of the Mathlamba mountains and Drachensberg, present numerous small rivers; of these the St. John is the largest; its native name is Umzimvubu; its affluents are principally from the left, and fall from a projecting terrace of the mountains, which is buttressed up by the Little Quathlamba range, from the northern side of which the Umzimyate, or Tukela river, draws its important southern affluents. The St. John may have a course of 150 miles, and is navigable for small vessels, but the other rivers between it and the Tukela are much smaller; this latter stream has probably a greater length, and drains a more considerable area; its principal source is also called the Umzimyati, or Buffalo, but it may be said to be formed by the confluence of three rivers, the Umzimyati on the north, the Tukela, or Utukela, in the centre, and the Mooi, or Impafane, on the south; the Tukela has numerous affluents; coal is said to abound in its basin; the north-eastern sources are in close proximity to those of the Umpoota, which falls into the southern extremity of Delagoa Bay, the intermediate semicircular space being occupied principally by the St. Lucia river.

Of the territory drained by these rivers it may be noted that it has three natural divisions—that of the coast, which is adapted to the cultivation of cotton, and the productions of sub-tropical climates; the thorn-land, on which the mimosa is the prevailing shrub; and the forest and open districts of the hills and table lands; this latter is well watered, and affords plentiful supplies of timber; many of the mountains here are of basaltic and porphyritic formation, but, as to the south, sandstone prevails.

Further north and on the eastern coast our knowledge is very limited. The Limpopo, a considerable river, rising in the northern extremity of the Drachensberg, has first a northerly and then an easterly course, and possibly falls into Delagoa Bay; English river, an estuary in this bay, receives the waters of several streams, is navigable for large vessels for forty miles, and for boats 200; beyond this the great Zambeze, or Leambye, so lately described by Dr. Livingstone, drains a large area between 10° and 18° south latitude, flowing from the eastern slopes of a table-land, from the north and west of which the Congo and Coanza have their rise also, and enters the Mozambique Channel by several mouths, extending over nearly seventy-five miles of coast, from the Luabo\* to Quilimane; one of these mouths is navigable, and good coal is reported as found on its banks.

This river does not flow from Lake Ngami, as had been thought, but it seems more probable that this lake has no outlet for its waters. It is situated under the twentieth parallel, is thirty miles long and fifteen broad, 3713 feet above the sea, and receives the waters of several streams, among which the Tiongue has a long and tortuous course from the north and west through a marshy country; its banks are swampy, but covered with luxuriant vegetation.

To the north of the Zambeze, near the tenth parallel, is the larger Lake Nyassi, the Sea, through which a considerable river flows, which may possibly be that which reaches the sea near Quiloa; it is the Lake Maravi of the ancient maps. Further northward, the mountains approach nearer

\* Dr. Livingstone's party has just entered this river from the sea to ascend, *viâ* Tete, into the interior.

the coast, yet there are still some considerable rivers which have their rise in the High mountains already noticed, but of these we have little satisfactory information; the more northern probably have their sources in close proximity to those of the Nile. Besides the lakes already mentioned, others exist northwards as far as the equator, and it seems probable, as has been hinted already, that the centre of the southern tropical region of Africa is an extensive marshy district, in which the rivers originate which flow both east and west into the Indian Ocean and into the Atlantic. Burton and Speke have penetrated nearly 500 miles into the interior from Zanzibar, without having seen the mountains or the lake. A well-defined watershed, however, extends from the valley of the Orange river between the sources of the rivers which fall into Lake Ngami, and the Norse river, which enters the sea to the north of Cape Frio: between the Norse and the Orange river is the Swakop, which has its channel from 800 to 1000 feet below the general level of the country.

## CHAPTER XXVI.

### RIVERS AND WATERSHEDS OF THE WEST AND NORTH.

§ 1. The Congo.—2. The Niger or Quorra.—3. The Senegal and Gambia.—4. The watersheds and rivers of the north.—5. The Central Basin.

**THE Congo.**—Of the watersheds of this coast nothing is correctly known; of the rivers as little. From the Walfish Bay to the Coanza the coast is almost *terra incognita*. This may, however, be said of it, that with the basin of the Congo its character changes altogether, resembling rather the districts of the eastern coast, having abundant vegetation, resulting from a most fertile soil combined with a hot and moist climate; yet of this great river, abounding as its valley does with natural wealth of all kinds in abundance, we know little more than that it is said to have its rise from two principal sources, the northern of which originates in a lake; that ninety leagues from the sea it is still four miles wide, but lower down, about 140 miles from the mouth, it forms rapids between cliffs of slate; these form the table land at the base of the mountain ranges, in which the sources of the river must be looked for; and the plain above is fertile and healthy. In the lower course of the river the banks are clothed with luxuriant vegetation; it is here a broad, very deep, but not very rapid stream, overflowing its banks in summer, and inundating the surrounding low lands.

2 *The Niger or Quorra.*—While the Congo has a westerly course, the Niger, Joliba, or Quorra has at first an easterly, to the north of the Kong Mountains, among the western extensions of which it is supposed to have its sources, at an elevation considerably below 2000 feet; but it is probable that other sources than those of which Laing heard, and which form the Joliba, exist to the north and east, and that the principal source is the Alimar. Like the Congo, its upper waters are navigable for vessels of considerable size; and it also forms rapids in passing through the defile which separates its upper from its lower basin: its valley is broad and fertile, often inundated by the waters, which in one place form a considerable lake, called Debo, and lower down bifurcate, forming extensive insular tracts: its navigation is, however, impeded for more than 100 miles in its passage through the mountains: in its lower course it forms many branches, stretching through an extensive delta to the sea, the principal of which are the New Calabar, Nun, Bonny, Forcados, and Benin. The river varies from one to five miles in width, may have a course of more than 2000 miles in length, and a basin exceeding that of the Nile in area; the principal affluents are the Sakkatu and Chadda. The influence of the tidal wave is said to extend about 120 miles from the sea, below the mouth of

the Chadda, formerly thought to flow from Lake Chad, but now proved to derive its waters from the central watershed already referred to: it is equal in breadth, but not in depth, to the parent stream; this affluent is from the left, as are the Mayarow and Coodonia. The Bonny River lies between the New and Old Calabar Rivers, and is the most western mouth of the Niger; the Benin mouth gives its name to the extensive bight into which the river flows.

The rivers which have their rise in the southern watershed of the Niger have but comparatively short courses, though most, like the Old Calabar, enter the sea by considerable estuaries.

3 *The Senegal and Gambia*.—Not different in character are these rivers from those already noticed: their courses have been estimated at 1000 miles, but may not improbably be more; they have their sources in the reverse slopes of the watershed of the Niger; their upper courses are through fertile and comparatively healthful regions; they form cataracts in the defiles through which they leave the plateaux, and in their lower course flow through alluvial plains covered with most abundant vegetation, but moist and pestilential. Vessels of some 150 tons may ascend to the rapids of the Gambia; and the Cazamanza—which enters the sea more than fifty miles from the known point of connexion—is considered one of its mouths. The Senegal has its rise in two principal sources, of which the Black Water (Ba-fing) rises at an elevation probably not inferior to that of the Niger; its upper waters flow through a more broken country, but its lower course is so nearly level that the tidal wave extends its influence for sixty leagues up its stream. The delta of this river lies between its two principal channels of communication with the sea, from which the apex is thirty-five miles; these are, however, obstructed by sand-banks; in the rainy season small vessels ascend to the rapids: the principal affluents are the Kokoro on the right, and the Faleme on the left, both being in the upper basin.

4 *The Watersheds and Rivers of the North*.—The culmination of these watersheds on the western coast of the continent has already been noticed. The principal of the ranges, known to Europeans by the collective name Atlas, commences at Cape Geer on the Atlantic coast, and trends in a north-easterly direction through Morocco: this is known to the natives as Djibbel Telge, and from it a lower range, but culminating in a lofty peak, said to exceed the snow limit, extends in a south-westerly direction to Cape Non, forming the northern watershed of the river Drah, which falls into the sea some thirty miles to the southward: it was formerly supposed to lose itself in the Desert, after a course of about 250 miles. Of the southern slopes of the Atlas Mountains we know but little: the spurs on the west are probably continued in the watersheds of the Niger and Senegal; they must enclose fertile valleys towards the Sahara; the descent is by gentle declivities.

The chain of the Greater Atlas with its spurs extends to the north on Capes Spartel and Bon, while the Lesser Atlas stretches to the coast on the north and west as far as Ceuta: the former is known to the natives as Djebel Tedla, the latter as Errif; this does not exceed 2000 feet in height; both, however, have their origin in the central knot, where the rivers Morbeya Omerbergh, and Mulwia, or Mahala, have their sources: further to the east are the mountains of Algeria, which culminate above 6000 feet, and are broken by the deep valleys of several rivers which flow into the Mediterranean. To the south of these another range is found, at considerable distance, which, from the course of the river, should be the principal of these ranges: it is thought, however, not to attain so great an elevation, though having greater breadth and solidity, features analogous to those already observed in other mountain ranges: the valleys between are of great fertility, and are not probably exceeded in this respect: portions of this range are known to the natives as Djebel Amer. The southern slopes of these mountains are continued in parallel ranges of undulating elevations, enclosing valleys, the fertility of which decreases as the Desert is approached and the absence of water is felt. On the north the spurs are extended to the coast, in one place only, to the

east of Algiers, presenting a level surface; on the plain of Metidyah the Nefusa hills stretch eastward towards the Gulf of Cabes.

In its geology this district seems to have analogy with those of Spain and Asia Minor; over a large proportion of the surface calcareous deposits predominate, as also do sandstones; saliferous deposits are also abundant; its mineral wealth must be very considerable: copper abounds, to the west iron and lead are also worked, while antimony is plentiful in the Tedla range. Forests of oak and cork clothe the sides of the mountains, the white poplar abounds in the valleys, the olive flourishes, and the dates of the southern slopes are famous. Of the rivers of the Atlas ranges little is known, the Morbeyah Omerbegh, or Umm-er-shieh, has a north-westerly course of probably 250 miles, as may the Mulwiah and Shelliff, or Chinalath, which flows through the marshy Lake Titteri: the other rivers, Isser Sumeim, Wad-el-Keber, Seibous, and Mejdard are less considerable; the Seibous may have a course of 100 miles, and was formerly navigable: that of the Mejdard, or Medjerdal, approaches 200 miles: these all lie westward of Cape Bon, to the east of which there are no rivers except the Nile. The Seibous, or Sebus, and Morbeyah flow into the Atlantic. All these rivers are rapid in their upper courses; and those which flow to the west have numerous affluent streams.

Characteristic of the change in the face of the country towards the east are the lakes of Benzerta in Tunis, the one at the foot of the limestone mountain Gebel Ischkel, of fresh but turbid water, three and a half miles long; the other nearer the sea, of salt water, five and a half miles long: they have been always noted for abundance of fish. The lakes are of an average depth of five fathoms, and separated by a neck of land two miles wide, through which a meandering channel, called Tinja, connects their waters: mineral springs are found at the base of Gebel Ischkel, and the surrounding country having a surface of sandstone and marl is highly fertile; similar lagunes to that of Benzerta, and also connected with the sea, exist at Risifa and Tunis, the latter of which is twelve miles long; on the east also, inland, intermittent streams form marshes and occasionally lakes, and here Lake Melgig, which may be above twenty-five miles long by fifteen broad, receives the waters of the Adje, a considerable river having a course of above 200 miles from the north and west.

5 *The Central Basin.*—The famous Lake Chad occupies the lowest part of the central basin of North Africa. The area of the lake is very considerable, and has been stated as 200 miles in length by 150 in breadth; but of this, notwithstanding its recent navigation, we are yet in doubt. The elevation of its surface above the level of the sea has been computed at 1200 feet, but the depth of its waters is inconsiderable; its form is irregular, its shores formed by verdant pastures, interspersed with marshes and thickets, the haunts of wild animals; it receives, from the south and west, the waters of the Shary and Jeou, and probably others from the east, and has been thought to discharge its surplus waters by the Tsadda or Chadda into the Niger, this opinion, however, has no evidence to support it; it contains several islands. The Shary is a considerable stream, entering the lake by several mouths, and being in some places a mile in breadth: the same name has been applied to the Chadda.

## CHAPTER XXVII.

### OF NORTH AMERICA.

- § 1. Historical sources of our knowledge of the interior.—2. More recent information.—3. Of the boundaries and limits.—4. Of the coast line.—5. Of the watersheds.—6. Of orographical classification.—7. Classification of rivers.—8. Geological formation.

**H**ISTORICAL Sources of our Knowledge of the Interior.—The interposition of the French province of Acadia between the British settlements in Newfoundland and New England produced jealousy and antagonism between their inhabitants, while its connexion with Canada, maintained by means of the natives on the St. John's River, gave unity of action to the one which was altogether wanting to the other. The habits of the French settlers also led them into closer connexions with the natives, so that several of them, as the Baron de Custine, became heads of tribes, and possessed of large tracts of country in right of their wives. The fur trade, the great source of wealth in the early days of those colonies, and by no means an unimportant one in some places at present, in the excitement and variety which its pursuit afforded, offered greater inducements to the French than to the Anglo-Saxon races, who, true to their nature, became for the most part agricultural; and thus it happened that the early exploration of the interior of North America is due to them rather than to us; and the routes across what are now New Brunswick, and the States of Maine, Vermont, and New York, by the St. John's, Penobscot, and Hudson rivers to the St. Lawrence, became familiar to them; indeed it may be assumed that much of the interior of that part of the country was better known to the early French colonists than until very lately to those now residing there.

To them also belongs the honour due to the exploration of the basin of the great lakes, and from thence of the Mississippi valley, which was effected by La Salle and De Tonty in the year 1678. The actual discovery of that river, however, is due to Marquette and Joliette, some five years before.

La Salle was commandant of Fort Cataragui on Lake Ontario, at the mouth of the river of the same name, known also as Frontenac, and now as Kingston; he built a vessel on Lake Erie, which he traversed, and reaching Lake Huron landed at the Miamis, since called St. Joseph's River, crossed from thence to the Illinois, and descended the main stream to the Gulf of Mexico; here he was murdered by his own men; but subsequently the French established themselves at the mouth of the river under Lemoigne d'Iberville, and De Tonty made several voyages up and down its stream, so that its course and the mouths of its affluents became familiar to them.

It should be observed that the Jesuits, and more especially the Recollets, were active in stimulating and assisting in all attempts at discovery in the interior from Canada.

After the conquest of Mexico the Spaniards, as already noted, had established forts on the northern shores of the gulf, and pushed their discoveries to the north-west and east until California on the one hand, and even Florida on the other, became known to them.

In 1640 Fernando de Alarcon ascended a great river at the head of the Gulf of California for eighty leagues, and Francisco de Coronado explored a large breadth of country to the east, probably that lying about the sources of the Gila, and from thence extended his researches into level plains, covered with herds of buffaloes, probably the prairies about the Arkansas and Platte rivers. These expeditions had originated in the fallacious accounts given by Friar Marcos de Niza respecting countries he said he had visited in an endeavour to reach others to the north-west of Mexico, of which accounts had been



given to the Viceroy by Alvaro de Cabez Vaca. In 1539, however, Fernando de Soto had sailed from Cuba, landed in Florida, travelled northward to the Chickasaw country, in latitude  $35^{\circ}$  or  $36^{\circ}$ , and thence turning westward reached the Mississippi, there died and was buried, his remaining companions returning by that river to the sea, and thence to Mexico.

In California the Jesuits atoned for the falsehood of the Franciscan, for an expedition undertaken for the settlement of that country by Isidro de Atondi having failed, they procured, in 1696, warrants authorizing them to enter it for that purpose; and Father Salvatierra and his brethren founded an establishment at Loreto, on the eastern side of the peninsula, in 1697, and within sixty years had added sixteen others, stretching from Cape St. Lucas to the head of the Gulf. But notwithstanding the success of their efforts towards the education of the natives, the Order was suppressed and its members exiled from the scene of their labours in 1767, and their places supplied by Dominicans. California became a province of Mexico, and the western coast was immediately occupied.

On the east coast, settlements were made in North Florida by John Ribalt under the French flag in 1562; and at May's River, to which the name Carolina was given, by René Landonier, in 1564; but the settlers were dislodged by the Spaniards, as these were again by the French under Dominique de Gourges in 1567, and from them no knowledge of the interior resulted. Nor were the first settlements made in Virginia, at Roanoke and its neighbourhood by Armidas and Barlow, by Sir R. Greenville, Lane, and White, under the direction of Sir W. Raleigh, more fortunate; nor was any permanent settlement effected until the division of Virginia between the London and Plymouth Companies, by James I., in 1606, when one was formed at Powhatan or James River by the former, under Mr. Piercy, brother of the Earl of Northumberland; and in 1607, the latter Company established settlers below the Sagadahook under Captain G. Popham; and in 1614 the Dutch established their first settlement on the Hudson; in 1620 the occupation of New England commenced at Plymouth; while in 1627 a colony of Swedes settled on the Delaware; the following year Endicott settled at Naumkeag in Massachusetts Bay, since called Salem; and in 1633, Lord Baltimore placed a colony in Maryland, and two years after, Fenwick established a settlement on the Connecticut; in 1669, Sayle commenced a settlement in Carolina, as did Penn in the district subsequently called after him, in 1682; Georgia was not occupied until 1732.

The operations and knowledge of these settlers, they being agricultural in their habits, were for the most part confined to the sea-board, but yet the excitement of the hunter's life, and the profits attending the trade in peltries, carried some of them into the interior, and probably across the Alleghanies, yet of the countries to the west of these mountains nothing was known but from the accounts of La Salle, de Soto, &c., until the relations of the Indian traders induced James Maclure and others to explore the country now called Kentucky in 1754; it was settled by Daniel Boone in 1773. Vermont had been settled in 1764: and thus imperceptibly the knowledge of the eastern slope of the American continent had been extended, and its interior basin explored. Of the unexampled rapidity with which this was afterwards accomplished, no greater proof can be adduced than that Kentucky became one of the States of the Union in 1792. But the exploration of the eastern part of the basin of the Mississippi was too independent and unconnected, too much the accidental result of individual interest, labour, and enterprise, to admit of description. It was otherwise to the west and north.

The cession of Canada by France to Great Britain in 1763 giving peace to North America, the energetic spirits who had found congenial employment in it, and habituated themselves to Indian life, became for the most part fur traders, and in consequence a great extension of that trade took place. The followers of De Salle, De Tonty, and Hennepin had ascended Red River and the Missouri, and no doubt most of the affluents of the Mississippi, as well as

the mountains from which they descend, had by this time become known to the trappers and voyageurs; and about the middle of the eighteenth century the existence of a great river to the west, flowing into the Pacific, had also become known; though the origin of that knowledge is buried in obscurity. It may be concluded, however, that the fur traders obtained it from the Indians, as Lepage Dupratz is said to have done; it is usually, but without reason, attributed to Jonathan Carver, who published *Travels through the Interior Parts of North America*, in 1778, and who first calls this river the Oregon, as he does the mountains from their perpetual snows the Shining Mountains. Notwithstanding, however, the want of originality in his work, there can be no doubt that, like Mandeville, he contributed very powerfully to the inducements to future exploration. But a further inducement was not long wanting. In 1771 John Hearne, in the service of the Hudson's Bay Company, set out to discover a river, spoken of by the natives as "the far-off Metal River," since known as the Copper-mine River, and pursued its course to the sea. This discovery of the sea, so far as 20° westward, as Hearne computed, of Hudson's Bay, revived the hopes of discovering the Strait of Anian, of Maldonado, and Juan de Fuca; and accordingly the English Parliament altered the terms of a reward of £20,000 offered in 1745, for the discovery of a north-west passage through Hudson's Bay, to the discovery of a passage in any direction from the Atlantic to the Pacific, northward of the 52nd degree of latitude. This produced, as has been shown (History of Maritime Discovery), the voyage of Cook: the consequences of which have been also noted: but it did more, it led Alexander Mackenzie first to the Arctic, and then to the Pacific Oceans, and the path once opened has never since been closed.

Hearne in his three journeys to the Copper-mine River had discovered Great Slave Lake, and must have been acquainted with the existence of the other great lakes with which it is connected, and of rivers flowing into them from the west.

The traders of Canada had organized an extensive association, under the name of the North-West Company, in which all the French elements were included, their right of trade being, as they not unreasonably supposed, altogether irrespective of the charter of the Hudson's Bay Company, since they existed before the cession of Canada to the English, and the King of England could not of course grant what did not thus belong to him. They acted on this belief, and extended their forts and trading stations up the Saskatchewan and other rivers, and approached the base of the Rocky Mountains on the west; while to the north and east they infringed upon the frontier of their chartered rival. The journey of Hearne was an isolated effort, but those of Mackenzie were indeed most important in their results, but not otherwise distinguishable from many made by the servants of the North-West Company, who were remarkable for their energy and enterprise. In his first journey in 1789 he traced the waters of the Slave and Peace rivers, and passing through Slave Lake, entered the river since known by his name, following its course to the Arctic Sea: in his second, in 1792, he ascended the Peace River for about 200 miles, and wintering there, the next year crossed the mountains to the sources of the Tatouche Tesse, afterwards named, from another servant of the North-West Company, Frazer's River, the course of which he followed for some distance; but finding it trend southward, and the accounts of its character by the natives not being satisfactory, and indeed, supposing it to be the Columbia, he returned on his steps, and striking westward across the country, reached the small river known as Mackenzie's Salmon River, and was borne on its waters to the Pacific, recording the fact on the rock at Point Menzies, which had been so named by Vancouver only six weeks previously.

The cession of Louisiana by the French to the United States, in 1803, directed the attention of that government westward, and in 1804 Captains Lewis and Clarke were sent to explore the Missouri. Having traced the course of that river to latitude 47°, they wintered among the mountains, from whence, starting in April, 1805, they reached the falls of the Missouri in the

same month, and subsequently the pass called the Grand Gates of the Rocky Mountains; in July traced the river to one of its sources, crossed the Rocky Mountains, and struck the Kooskooskee branch of the Oregon, afterwards called the Columbia, the great river of the west, and after a journey of 400 miles along its course reached the Snake, or great southern branch of the river, to which they gave Captain Lewis's name, and building canoes, floated down its waters, passed the falls and narrows, and arrived without accident at the head of the tide water, from whence it took a fortnight to the mouth of the river; here they built a fort and wintered, explored the coast for about 30 miles to the south, and in the spring set out on their return: on reaching the Kooskooskee, however, they did not retrace their old route, but directing their course eastward, struck the Flathead River near the 47th parallel, and Captain Clarke proceeding up it crossed to the sources of the Yellowstone, while Captain Lewis crossed the mountains in latitude  $47\frac{1}{2}^{\circ}$  to the sources of Maria's River, a tributary of the Missouri, and joined his comrades at the mouth of the Yellowstone. The trials and sufferings attendant on this expedition are well known, as are the constancy and courage with which they were surmounted; the geographical results, beyond the knowledge of the sources of the Missouri and the Oregon, as well as the course of the south branch of that river to the sea, were the knowledge of three practical passes across the great mountain barrier which separates the valley of the Mississippi from the Pacific coast.

The following year Mr. Simon Frazer crossed the mountains further north, indeed to the north of Mackenzie's track nearly 100 miles, in order to extend the operations of that company, which had been limited by the cession of Forts Detroit and Michilimackinac to the United States. He established a trading post on a lake at the head of the Tatouche Tesse river, and gave it his own name, which it still retains. From 1808 to 1810 the American fur traders repeatedly crossed the mountains, and attempted to establish themselves on their western slopes; and Mr. Astor, of New York, having founded a company on a large scale for the promotion of the fur trade, a fort was established, called Astoria, at the mouth of the Columbia; this was however done by sea, the party sent by land not reaching it till the next summer, *i.e.* in March, 1811; and in July Mr. Thompson, the astronomer of the North-West Company, reached the same spot, having descended the northern branch of the Columbia from the fifty-second parallel, but being delayed in his journey by the severity of the winter. The party sent overland to Astoria having kept as far south as latitude  $40^{\circ}$ , in consequence of the hostility of the Indians, crossed to the head waters of the Snake River, which they traced to its confluence with the northern branch, and then to Astoria; and in 1812 Mr. Ross Cox, leaving that fort, proceeded up the Snake River, then turning northward struck the Spokane, proceeded thence to the Okanagan, explored a large tract of country about these affluents of the Oregon, and subsequently made the journey to Canada by the northern pass about the head waters of the northern branch of that river.

In consequence of the war, and the dominion of the English in the Pacific, Astoria passed into the hands of the North-West Company, who expelled their rivals from the western slope of the Rocky Mountains, to which they did not return for fifteen years; but many independent traders established themselves on the lakes and streams about the head waters of the Great River, as Pilcher on Flathead Lakes in 1827, and Bonneville and others in 1832, so that the country became tolerably well known, as it was not inaccurately represented on the private maps of the North-West Company. Further information was obtained from missionaries from 1834 to 1840, as from Messrs. Townsend, Spalding, and Farnham, until the expedition of Fremont and the other surveyors of the United States government.

On the eastern side of the Rocky Mountains, Major Pike had been sent in 1805 to trace the Mississippi to its source, which was found in some small

lakes on the height of land, and of these Lake Itasca has since been selected by General Cass as the principal source; subsequently the same officer was sent to explore the Arkansas and southern Red River, but striking the course of the Rio del Norte by mistake, he fell into the hands of the Spaniards. In 1819 research was resumed; Major Long and Dr. James having examined the mountains south of the Missouri, descended by mistake the Canadian River to the Arkansas, and the former officer subsequently ascended St. Peter's River, the sources of which he found in close proximity to those of the northern Red River, since when the larger portion of the country has been surveyed for the purposes of allotments for roads, canals, and railroads, of which latter five at least have been projected across the continent from the Mississippi to the Pacific.

The basins of the southern portion of the western coast were opened to our knowledge by Fremont; no doubt they had previously been visited by the mountaineers of the Far West, the daring pioneers of civilization, but of their discoveries he knew little, we perhaps know less. In 1843 he traced the Platte River to its sources in the mountains, ascending the southern pass to an elevation of 7000 feet by insensible degrees, and struck the sources of the Colorado: in the following seasons Lieutenant Fremont visited the Salt Lake in Utah valley, entering by the Bear River, which flows into that water, followed the course of the Columbia to the sea, and crossing the Sierra Nevada to the sources of the Sacramento (as Mr. Ermatinger, in the service of the Hudson's Bay Company, had previously done), reached the Bay of San Francisco, and thence proceeding eastward by the St. Joaquim, made further explorations among the Rocky Mountains to the south and east of the Great Salt basins and about the head waters of the Arkansas and Platte; and since then the courses of the Rio del Norte and Colorado have become better known, as the boundary of the United States to the west has been gradually extended in this portion of the continent. Much however still remains to be done.

On the north an attempt was made by Lieutenant Franklin and Dr. Richardson to connect the discoveries of Hearne and Mackenzie; in 1820, wintering at Athabasca Lake, they reached the Arctic Sea, in July, 1821, traced the coast as far as longitude  $109\frac{1}{2}^{\circ}$ , and returned across the country to Copper-mine River. In 1825 the same indefatigable travellers, wintering on Bear Lake, reached the mouth of the Mackenzie in the spring, from whence Franklin proceeded west and Richardson east—the former, as already noted in the History of Maritime Discovery, nearly connected his discoveries with those of Beechey—the latter reached the limit of their former discoveries to the east. Capt. Sir John Ross having spent four winters among the ice, among other means for his discovery, Captain Back followed the course of the Fish River to the sea; and the subsequent journeys of Dr. Rae have completed our knowledge of the northern shores of the continent from Boothia Felix to Cape Barrow. In 1834 and in 1840, Messrs. Bell and Isbister ascended the Peel River, an affluent of the lower course of the Mackenzie; and the journeys of Richardson to the north, and of Sir G. Simpson across the continent, have added somewhat to our knowledge of the north-west part of North America, but what we do know is little indeed. In the centre the government surveys for the boundary line, and the constant traffic of the Hudson's Bay Company, have given us some acquaintance with the lakes and rivers connecting Lake Superior with Lake Winnipeg; and the servants of that company have traced the route by the Nelson River to the same lake year by year. The French Canadians first crossed from the St. Lawrence to James's Bay. The district between that river and the St. John was a *terra incognita* to the learned, although it had been the trading and post road from the Bay of Fundy to Quebec as early as the time of the French company, as indeed it had been the native path before, until the disputes about the boundary between the United States and the British territory necessitated its survey; and it is to be hoped that the continuation of the line to the west will give us reliable information respect-

ing the district which separates the Saskatchewan from the 'Missouri, sufficiently well known indeed to the native, the trapper, and buffalo hunter, but respecting which accurate geographical details are wanting.

2 *Recent information.*—Of this but little can be added to what has been given. A few miles of the eastern coasts of Vancouver's Island have been traced by Mr. Douglas, its governor, and a survey by Col. Stansbury in the Utah territory of the United States, and reconnoissances about the Rio del Norte and Colorado by Captain Murray and Lieutenants Simpson and Whiting, have been effected; but the course of the Colorado, and the district between it, the Gulf of California, and the table land of Mexico, remains still but little known. The same may be said of the territory nominally under the government of Russia, in the north-west angle of the continent, of which, and the great river Colville, draining, we may presume, the larger portion of it, we know nothing; and indeed our knowledge of the territory occupied on the western coast by the Hudson's Bay Company, and even of Vancouver's Island, its nominal colony, is but little, and what we do know, little as it is, is confined to certain localities. The visit of H.M.S. *Thetis* to protect the gold in Queen Charlotte's Islands, has proved their plurality; and it is to be hoped that the expeditions which have, in consequence of war, been sent to the Russian settlements, will at least bring back some geographical information, and teach men how large and fine a portion of the surface of the world is lying waste and kept as a preserve for wild animals.

The desire of communicating by railroad between the Atlantic and Pacific has already led to the survey of several different lines by private enterprise, and the government of the United States propose the extension of its surveys to the south of the forty-ninth parallel; it is to be hoped this may stimulate the English government to active exertions in the same direction.

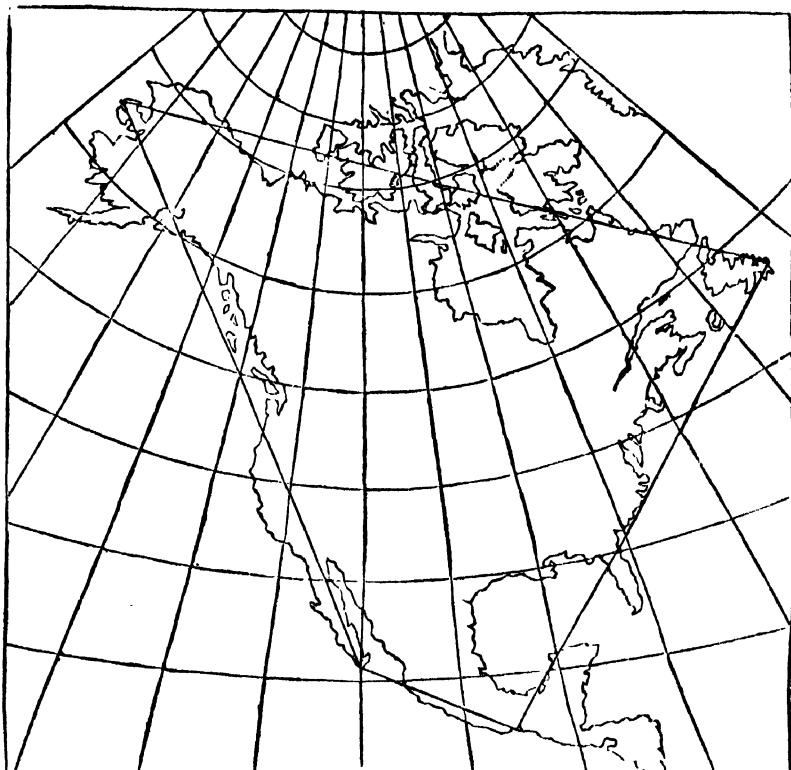
3 *The Boundaries and Limits* of North America may now be more accurately defined than they could previous to the discoveries of Dr. Rae and of Captains Collinson and McClure, whose recent adventures in the Arctic Seas have connected the discoveries of the former with those of Parry, and shown the land to the north to be a congeries of islands of various sizes, and that Boothia Felix is the most northern portion of the American continent, forming an irregular but extensive peninsula, corresponding to Melville peninsula on the east.

The comparatively narrow waters separating the islands to the north from the main land are Sir Thomas Rowe's Welcome, connecting Hudson's Bay by Frozen Strait with Fox's Channel on the east, which is again connected with the Gulf of Boothia by Fury and Hecla Straits; the northern limit of the Boothian peninsula may probably be Bellot's Strait; but the Strait of Sir James Ross to the west of the isthmus, which unites it to the main land, has two channels of communication with Simpson's Strait to the south; that to the east being Victoria Strait, the limit of Victoria Land in that direction, and connecting the coast waters with Barrow's Strait by Peel Inlet, as Investigator Strait, separating Victoria and Albert Land from Baring Island, does with McClure's or Banks' Strait to the west, and from thence the water communication is continuous by Dease's Strait and Dolphin and Union Straits to Cape Bathurst, from whence to the westward the limit of the continent is the Polar Sea.

The islands to the north, and possibly Greenland, must however be considered as much belonging to the continent as the Indian Archipelago and Australia to Asia, so that in one sense the Polar Sea may be considered the limit of the continent to the north.

Nor is the southern limit of its northern division easily determined, whether to extend it to the Isthmus of Panama, or to the bays of Honduras or Campeachy; physically, the former is the more natural limit, but the extent of what is called Central America, and its intimate connexion with the northern and southern divisions, make limitation difficult indeed; an isthmus can never be a separation, but since the larger portion is attached to North America, and has

its connexion to the north, the Isthmus of Panama may be most usefully considered as the point of division. On reference to the table given (pp. 204-5), the comparison between the normal figure and true outline may be instituted as before, from which the projections of the latter without the lines of the former, will be apparent. A table of the positive positions of the extreme points is subjoined:—



Cape Race . . . . .	46° 40' N.	53° 7' W.
Tehuantepec . . . . .	16° 11' N.	94° 44' W.
Cape St. Lucas . . . . .	22° 52' N.	109° 53' W.
„ Prince of Wales . . . . .	65° 20' N.	165° 25' W.

The mean area of North America has already (p. 205) been stated as 7,666,900 English miles.

4 *The Coast Line.*—The Western Continent differs altogether in its vertical, and consequently in its horizontal, contour from the old; its two parts differ also essentially from each other, and this difference is most observable to the north, where the irregularity of the coast line is the greatest; but here the vertical contour is but slightly developed in comparison to the horizontal extension, in this showing analogy to the north and north-east of Asia, as is also apparent, not only in the promontorial extensions, but also in the extensive indentations at Hudson's Bay and the Gulf of Boothia; in this portion of the continent the coast line must exceed the average proportion to the area very considerably, while on the western coast, as on the north-western coast of Europe, deep, narrow, and very irregular channels, stretching into the land, produce the same result; nevertheless, the general variation will not be found so great as in Europe. On the north-west the great promontorial extension,

and on the south-east the Gulfs of Mexico and Florida, produce a similar but not so considerable effect; but here again the islands, whether the Aleoutian or the West Indian, can scarcely be left out of the consideration. The Gulf of St. Lawrence and the system of lakes, the waters of which it receives, are without parallel on the face of the earth. As already estimated, the proportion between the area and coast line would be 228, the former 5,472,000, square miles, and the latter 24,000 linear miles. The principal indentations and projections may be estimated as follows:—

Indentations.		Projections.	
Hudson's Bay . . . . .	10°	Nova Scotia . . . . .	1½°
Gulf of St. Lawrence . . . . .	4°	Florida . . . . .	5½°
Bay of Fundy . . . . .	2½°	Central America, from Tehu- } antepec . . . . .	18°
Gulf of Mexico . . . . .	15°	Alaska Peninsula . . . . .	8°
Gulf of California . . . . .	10°	Boothia . . . . .	4°
Strait of Juan de Fuca and } Puget's Inlet . . . . .	2½°	Melville . . . . .	3°
Cooke's Inlet . . . . .	2½°		
Norton Sound . . . . .	2½°		
Gulf of Boothia . . . . .	3°		

5 *The Watersheds.*—The line of water-parting in North America is comparatively regular, and its principal watersheds well-defined; these are two, on the west the Rocky Mountains extend from the great table land of Mexico in a north-westerly direction at varying distance from the coast line, to which they approach closely in its more northern portion; Mount St. Elias, near the intersection of the sixtieth parallel of north latitude with the meridian of 140° west from Greenwich, extending its spurs into the sea, and being the culminating point in that direction; spurs radiating to the north and east form the limits of the basins of the Mackenzie and Colville, while the extension of the main chain must be looked for in the peninsula of Alaska and the Aleoutian islands, which connect it with the mountain systems of Asia by the peninsula of Kamtschatka: the long slope throughout being the reverse, *i.e.* to the north and east, the short that to the sea on the south and west.

The central portion of this great chain may be considered to be the primary watershed of North America. In it, between 40° and 55° north latitude, are found the sources of all the great rivers of the continent, the St. Lawrence excepted, and from it spurs of very considerable elevation on the west, but not exceeding 1800 feet on the east, separate the basins of those rivers. Of the elevation of this portion we have not as yet positive information; rising far above the region of perpetual congelation, its peaks cannot be less than 15,000 feet above the level of the sea, and some may possibly reach 20,000. To the west of this main chain another, uniting with it to the south, and in the north passing out through Vancouver's Island, and the Archipelago beyond it, forms the secondary limit of the basins of that coast; this is known as the coast chain, and is attached to the main chain by the Sierra Nevada, which separates the basin of the Columbia from those of Utah and California, and is apparent on the coast at Capo Mendocino; and in like manner on the east the Alleghanies, and their extensions to the north and south, form the secondary watershed of the Mississippi; the watersheds of the coast to the north and east pass out into Labrador.

6 *Orographical Classification.*—This, from what has been said, must appear extremely simple, and will be as follows:—

Primary Watershed  
The Rocky Mountains

Secondary Watershed  
The Alleghanies  
The western coast range.

Of tertiary ranges there are none, the ranges of Nova Scotia and the Kotzebue mountains being extensions of the secondary and primary systems respectively.

7 *Classification of Rivers.*—This is of necessity equally simple, and will be thus arranged :—

## Primary rivers.

The Colville  
Mackenzie  
Saskatchewan  
Mississippi  
Rio del Norte  
Colorado  
Sacramento  
St. Joaquim  
Columbia  
Frazer's River, and others to the north.

## Secondary rivers.

With the exceptions already made, all the rivers falling into the Arctic Sea, Hudson's Bay, the Atlantic, and Gulf of Mexico, unless the St. Croix and some few of the smaller be considered tertiary.

The St. Lawrence must be also considered as exceptional, unless the secondary chains of the east be considered as extending round the basin of the Great Lakes, for the sources of the rivers which flow into Lake Superior, and which must therefore be considered as its head waters, are found in the eastern slopes of the waterparting between the rivers of the north and south, which is an extension, as already noticed, of an eastern spur from the primary range. The extreme development of the primary rivers, especially in the centre, is the characteristic feature of the northern part of the New World, as it will be found to be of the southern also, and in this will also be observable the characteristic differences between the climate and productions of the eastern and western continents, as well as of their causes ; possibly half the northern portion may be drained by the rivers Mackenzie, Saskatchewan, and Mississippi. The Great Lakes, as already observed, form an exceptional and unique feature in the western hemisphere, as the Caspian and Lake Aral do in the eastern.

The extraordinary facilities thus presented for water communication across the continent in every direction, not only from the proximity of the head waters of the rivers and their connexion by lakes, but from their size and incomparably navigable qualities, have fitted this continent for the rapid settlement which has already taken place in its northern division, and must soon be effected in its southern ; at the same time it will give the superiority to the coast districts on either side over the centre, and to the lake district probably over all other portions of its surface. We must not expect to find in the centre or the south of the valley of the Mississippi, much less in those of the Saskatchewan or Mackenzie, the same development of intellect or industry which is already presented on the eastern coast and in the lake district, and cannot long be wanting to the western coast, which has this advantage over the eastern, that from the narrowness of the Atlantic, and consequent facility of communication, the latter must always remain more or less under the direct influence of Europe, while the former, peopled by a race whose maritime tendencies will acquire their largest development on the shores of the wide extended Pacific, will have to direct the destinies of the people to whom in future ages its islands may be appointed as a home.

8 *Of Geological Formation.*—This is, as might be expected, speaking generally, as simple as the orographical classification, though, in this as in the other, an exception is observable, and in the same locality.

The larger portion by far of this continent has for its surface the primary schistose formations ; these extend from north to south on the western side, and through the north-east from New England to the Arctic Sea. The valleys of the Mackenzie, Saskatchewan, and Mississippi present extensive formations of the transition series, with vast carboniferous deposits, which extend into the valley of the Great Lakes and St. Lawrence, and to the western slope of the Alleghanies ; these are apparent also on the shores of the Gulf of St. Lawrence and Hudson's Bay, as well as those to the north of the continent, and in the islands to the west of Baffin's Bay : in Greenland,



the islands of the north-west coast, the valleys of the Columbia, Utah, St. Joaquim, and rivers of California: not improbably, also, in the basin of the Colville.

The secondary deposits extend over a large, but comparatively inconsiderable area, are most observable in the cretaceous formations about the Missouri and its affluents, and on the eastern slope of the Alleghanies; while the tertiary extend round the northern shores of the Gulf of Mexico, and along the base of the Rocky Mountains in the valley of the Mackenzie.

Volcanic action is present in Mount St. Elias and other mountains of the north-west coast, as well as in the valley of the Columbia, in the peninsula of California, and the plateau of Mexico, in all which it has been of recent appearance. Much also of the coast of Greenland bears evidence of this, as do spots now isolated on the north coast, and among the islands of the Polar Sea. Ancient volcanic action has left its evidences throughout the continent.

In no part of the world is it probable that more recent and more considerable changes have taken place than in America. This is well known of Mexico, and the central and southern portions of the continent; and evidences of it are not wanting in other parts, especially in the lake basin and the western coasts: in the former, at present the waters are said to be rising, and no place exhibits more sufficient proofs of successive elevations of surface. It is probable that much if not all of the eastern and northern coast is rising, but data for correct induction are wanting throughout the greater extent of surface.

## CHAPTER XXVIII.

### WATERSHEDS AND RIVERS OF THE WEST.

- § 1. The primary watershed.—2. The mountains of the coast.—3. The central basin.—  
4. The rivers of the west.

**THE Primary Watershed.**—Of this vast range of mountains little is known beyond those portions adjoining the passes, by which, at the head waters of the great rivers, access has been obtained from the valley of the Mississippi to the western slopes. It has been customary to speak of three distinct ranges as observable throughout the length of the continent, of this however we have no sufficient evidence; but on the contrary, the course of the rivers shows, that if these ranges are to be distinguished in the principal river basins, their continuity is broken between the Columbia and rivers of California, as well as to the north of Frazer's River. It appears more reasonable to conclude that, as in the Himalayas, so here also, the spurs extend at but slight angles from the main chain, and leave the upper valleys of the rivers nearly parallel to its axis. The radiation of the various streams forming the head waters of the primary rivers from the central portion of this range, as already noticed, renders it the most important, and that where description should commence; and here, as elsewhere, we find the outlying peaks higher than those of the main axis of elevation. These are found to the east in the Wind River and White Mountains; about the sources of the Yellowstone, Platte, and Arkansas rivers: here Long's Peak, James' Peak, and others exceed 11,000 feet in elevation, and the Bighorn may attain to 15,000 between the valleys of the Arkansas and Bravo rivers: Spanish Peak and the Cirro Obscuro are estimated at 10,000; these are the outlying and probably the culminating peaks to the south and east; but higher are said to exist to the west of the Salt basin. The mean height of the principal range, from which these peaks may be detached some sixty miles, is probably not less than 10,000 feet, and this is the elevation given to the transverse spur which extends to the coast

at Cape Mendocino, and is known as the Sierra Nevada. On the north the elevation may be somewhat greater, Mounts Brown and Hooker, at the sources of the northern branch of the Saskatchewan, having been estimated at about 16,000 feet, while other peaks about the southern sources of the same river attain a considerable elevation, but none have been accurately measured.

From the central range the transverse spurs do not extend far to the east, but beyond the outlying peaks already noted the descent into the valley of the Mississippi is very gradual. There are however three which may be noted, the Black Hills in the centre, which are opposed to the range of the Sierra Nevada, and extend to the junction of the Missouri and Yellowstone rivers, forming the southern watershed of the latter. These however do not attain any considerable elevation, and towards the east their elevation does not probably exceed 1700 feet. On the north a range of hills, of which we know nothing but their existence, extends between the Missouri and the Saskatchewan, and these are extended to the south in the Côteau des Prairies, between the Missouri and Mississippi, the lowest elevation between the rivers of the north and south being about 1250 feet. From hence, again, irregular and broken ranges stretch eastward towards Lake Superior, and unite with the watersheds of the basin of the Great Lakes: these, more mountainous in appearance, do not attain greater elevation. On the south, the Sierra de Saba, forming the eastern limit of the basin of the Rio Bravo, is extended in the Ozark Mountains—not much more worthy the name than those to the north, which form the limit of the upper basins of the Colorado, Red, and Arkansas rivers, and extend towards the spurs of the Alleghanies, which embrace the valley of the Tennessee.

The central range of the Rocky Mountains is known to the south, where it joins the plateau of Anahuac, as the Sierra Madre, further north as the Sierra de los Minbres; but of this portion we know little beyond these general appellations: further north the Sierra Verde forms the south-eastern cincture of the Great Salt basin.

The eastern side of the main range presents a series of granite precipices, through the deep chasms in which the rivers rush with fearful rapidity, but from the base of these the slope is very gradual; this is broken again by ranges of conglomerate, sandstone, and limestone, culminating at about 6000 feet, and from thence the prairie slopes even more gradually to the Mississippi; in longitude  $95^{\circ}$  the mean elevation may be 700 feet, in longitude  $105^{\circ}$  4500; the axis of the sandstone and limestone ranges may be about the 106th meridian, and that of the superposition of conglomerate on the granitic rocks, about the 109th meridian; from it to the summit of the south pass, the elevation may be about 2500 feet in 200 miles.

The southern pass at the head waters of the Platte is 7000 feet above the sea, and near it Mr. Fremont measured the elevation of the highest peak of the Wind River range, and found it 13,570 feet; the superior limit of trees was about 10,000 feet, which was also the inferior limit of perpetual congelation; ice fields, possibly glaciers properly so called, occupy here considerable areas.

This, as the pass most used by travellers from the east, is better known than any other in the Rocky Mountain chain, and it is only from analogy with this that we can arrive at any results with respect to the others. Those by which Lewis and Clarke crossed and re-crossed the mountains at the sources of the Yellowstone and Missouri are not nearly so accessible, and have probably a greater elevation. The best known pass to the north, viz. that between Mounts Brown and Hooker—in which is situated the small lake called the Committee's Punch Bowl, which discharges its surplus waters into the Mackenzie on the east, and the Columbia on the west—may have about the same elevation as the south pass, but is far more rugged and barren, the rocky precipices being overhung by as rugged glaciers: one still further north has been similarly described by Ross Cox: one to the south by Sir G. Simpson; the former was estimated at 11,000 feet in elevation—most probably much in excess of its actual height—the latter at between 7000 and 8000 feet:

in both, small lakes, about twenty feet apart, formed the sources of the waters, flowing in opposite directions, and the surrounding peaks were supposed to rise above 12,000 feet; the latter was practicable for horses, and Sir G. Simpson also records the passage of emigrants with wagons, though over one still further south. It may therefore be concluded that the difference between these passes is due rather to latitude than the character of the mountains.

2 *The Mountains of the Coast.*—As has been already noted, the main chain of the Rocky Mountains trends to the westward beyond the fiftieth parallel; here Mackenzie crossed them on compact snow in July, in longitude 125°, latitude 53°; Mount St. Elias, under the sixtieth parallel, in longitude 140°, is estimated as attaining 18,000 feet in altitude, and Mount Fairweather, a little to the south, somewhat less.

The sandstone and limestone ranges at the base of the main chain to the south reappear again to the north, but at greater distance, and no longer parallel to the main axis, and form the western limit of the valley of the Mackenzie River, and the watershed of the Peel and Rat affluents of its lower course: of the intermediate region we know nothing.

The western spurs from the main chain appear on the north to be extremely irregular, dividing the country into numerous small valleys, filled by lakes and rivers. Near the centre they are better defined, the valleys larger, lakes and rivers of greater area and length: both to the north and south basaltic rocks abound; other evidences of volcanic action are common. To the south they enclose the basin of the Great Salt Lake, and stretch in deep, long, and nearly parallel chasms and ravines towards the south-east and south-west, through which the Rio Grande and Colorado rush to the Gulfs of Mexico and California. As the Ozark chain has its root in the eastern watershed of the former, so the coast chain has in the western watershed of the latter, being an extension of the Cordillera de Sonora, which, with the Sierra Madre, becomes distinct from the plateau of Anahuac under the northern tropic. From the Colorado the coast chain appears to form the eastern limit of the basin of the Sacramento and San Joaquin, and then unites with the Sierra Nevada, beyond which it again becomes distinct, limiting the basin of the Wathlamath, or Willamette, a tributary of the Columbia, to the north passing round Puget's Inlet, and forming that remarkable congeries of mountains noticed by Vancouver about the fiftieth parallel. In this range peaks of very considerable elevation are found; Mount Shaste, supposed to be the culminating point; Mount Hood, estimated as rising 11,500 feet above the sea; Mount St. Helens, Mount Rainer, and Mount Baker, all exceeding the limit of perpetual snow. Another range here also appears, forming the coast-line, by some considered the principal extension of the Sierra de San Marcos, or Alps of California, the coast chain to the south; this is not so lofty, but nevertheless Mount Olympus, to the south of the Strait of Juan de Fuca, approaches closely to the limit of perpetual snow, and the elevations in Vancouver's Island though less are still considerable.

3 *The Central Basin.*—The inland basin of the Salt Lake is one of the most remarkable natural features of the western slope of the Rocky Mountains, and it promises to be politically not less so. It must be considered as including the basins of all those smaller lakes and their tributary streams which have no outlet, and do not discharge their waters into the ocean.

The characteristics of this basin differ little, if at all, from those of similar districts already noticed in Asia Minor and elsewhere, the immediate cincture being for the most part of sandstone and limestone mountains, from which hot and saline springs gush, and in the bosom of which vast deposits of rock salt lie stored up for the future use of man; those to the east are known as Bear Mountains, and are accessible from the Wind River range by a pass exceeding 8000 feet in altitude; from these a considerable river of the same name descends into the Great Salt Lake, while another stream, called the Jordan, unites with it the waters of Utah Lake to the south. Bear River is deep and sluggish, varying near its mouth from 100 to 600 feet in width; it has a considerable

affluent, the Roseaux, of the same character. The size of the Great Salt Lake probably varies with the character of the seasons; it may be estimated, however, as above seventy-five miles in length from north to south, and somewhat less in breadth; it is deeper than most salt lakes, has rocky islands in it, one of which rises 800 feet above its waters; its shores are low, swampy, and fertile; it is about 4000 feet above the sea. To the south of Utah Lake is Nicollet river and lake, and other smaller streams on the eastern side of the great basin. These seem to be separated from those on the western side by a range of elevated peaks, some of which rise 3000 feet above the lake, on the western side of which, among smaller lakes and streams, Humboldt River and Lake, Mud Lake, Pyramid Lake, and Walker's Lake, deserve mention. This western portion of the basin appears to be more elevated and more rugged than the eastern, some of the intersecting valleys being 6000 feet above the sea; and Pyramid Lake, so named from a pyramidal rock which rises 600 feet above the waters in the centre of the lake, being 1890 feet, or nearly 700 feet higher than the Great Salt Lake; it is about thirty-five miles long, and receives a considerable stream from the south.

The range of mountains separating the basin of the Great Salt Lake from the valley of the Sacramento is, in Mr. Fremont's opinion, higher than the corresponding portion of the Rocky Mountains, the pass by which he crossed it,  $11^{\circ}$  west and  $4^{\circ}$  south of the south pass, being at an elevation of above 9300 feet. The descent from these mountains to the west is very precipitous. The south-western limit of this basin appears to be formed of rugged and very irregular mountains, called by the natives 'Wapshatch,' in which the Virgin, tributary to the Colorado, has its rise, and flows through chasms 2000 feet deep, while the Sevier and other streams flow from their northern slopes into the lake of the same name. Here, at an elevation of about 5000 feet, the valley is of great beauty and fertility; but further north and east about the waters of the Trinpanago, the rugged and barren features again predominate.

4 *The Rivers of the West.*—On the western slope of the northern division of the American continent we find four large rivers, beside several others worthy of mention; of these the Columbia is the most important, not only as draining by far the larger area, but as deriving its principal sources from the mountains about those passes already named, by which they are most readily crossed, the southern source being under the forty-second parallel, and the northern under the fifty-third; separated thus by more than 600 miles, and having their courses in opposite directions, the two main streams of this river must always be the great arterial means of communication between the centre of the continent and the coast of the Pacific. The general character of the districts through which these rivers flow is very different; the southern rushes through deep chasms among the mountains, where bare rocks are only occasionally varied by small plains covered with *Artemisia*, or secluded but well-wooded valleys; in its lower courses this also passes through country bearing evidence of severe volcanic action; the northern has its upper course for the most part through a similar country, but interspersed with swamps, small lakes, and morasses; in its middle course, however, this river and its affluents flow through woods and fertile valleys, and spread into extensive and very beautiful lakes, but as it approaches the point of confluence, it passes through an arid volcanic desert. The valley of the estuary is extensive, well-wooded, and abundantly fertile. The intermediate space, however, along the base of the Rocky Mountains, is far more attractive in its features; here the lakes are surrounded by fertile meadows, and the rivers flow through valleys the sides of which are clothed with magnificent timber; here also, especially to the south, about the head waters of Salmon River, are plains on which the buffalo still lingers.

The main stream of the Columbia or Oregon is formed by the confluence of two rivers, the northern or Okanagan, the southern or Sahaptin, Snake, or Lewis River; the name Columbia is now perhaps more commonly applied to the northern source, although the southern is no doubt the principal. The

most important affluent of the Snake River is Salmon River, which rises in the Wind River range, near the sources of the Missouri; it was by this valley that Captain Clarke returned from the Columbia. The others are, on the right, Malade, Reid's, Boissée, and Kooskoos-kee; and on the left, Ouwihyee and Malheur, which latter rises in the Blue Mountains, and flows through a lake of considerable size; none of these, except Salmon River, can be considered navigable. The main stream of the Snake River originates in the mountains about the southern pass.

The northern stream has its principal sources far apart, the more northern, called the Columbia, rising from three streams, the centre of which has its source between Mounts Brown and Hooker, as already noted; while the southern, rising near the southern sources of the Saskatchewan, under the fiftieth parallel, flows northward 150 miles to the point of confluence along the base of the Rocky Mountains, and 300 miles further south the sources of Clarke's River interlace with those of the Missouri; the Columbia is joined on the right by the Okanagan, which flows through the lakes of the same name, and on the left by the MacGillivray, or Kootonaie, flowing through Flatbow Lake, Clarke's River, which flows through Kullespelm Lake, and the Spokane, which has its rise in Pointed Heart Lake.

The Cascade range limits the valley of the Columbia to the west, as the Blue Mountains do that of the Snake; to the south of the latter, however, the small stream of the Cowlitz opens communication from the right with Puget's Sound, while from the left the Willamette or Wathlamath drains the large and very fertile valley between the Blue Mountains and the coast range. At the confluence of its two main streams, the Columbia is nearly 1000 yards across, deep, and rapid, but lower down it is narrowed and rendered unnavigable by the famous Dalles, or narrows, below which the mountains still contract its channel, and break its waters into a series of cascades; these are about forty-five miles from the Dalles, and below them the river widens and deepens, becoming navigable for vessels of 450 tons burden from thence 150 miles to the sea. To this point, also, to which Vancouver's survey extended, and which has been named from him, the influence of the tidal wave is felt. All the affluents of this river, even the Wathlamath, deep and navigable as it is at the mouth, are broken by falls, the others are also extremely rapid, and therefore do not facilitate ascending traffic.

The estuary of the Columbia is very extensive, diversified by numerous low wooded islands, and expanding near the sea into a gulf nine miles in width, the entrance to which, however, is not more than one mile, and presents dangers to navigation both without and within. Nothing can exceed the beauty and fertility of the country about the lower course of the Columbia and its tributaries, the Wathlamath and Cowlitz; the park-like prairies, the giant trees, the pines often rising 150 feet without a branch, and having a diameter at the base of fifteen feet, the lofty mountains rearing over all their snowy summits, have been the theme of universal praise. The entire course of this river is usually estimated at 1000 miles, but it can scarcely be less than 1500.

To the north of the Columbia is Frazer's River, not differing much in character from the northern branch of the Columbia, but flowing through a country of rock and cedar, swampy, and more cold and barren: it is the Tatouche Tesse which Mackenzie mistook for the Columbia; its course is about 500 miles, and it debouches into the Gulf of Georgia just to the north of the forty-ninth parallel; it is not navigable for more than twenty miles: its sources interlock with those of the Peace, Simpson's, and Mackenzie's Salmon rivers, being distant from the source of the latter only 817 paces; it forms numerous lakes throughout its course. Of the latter of these rivers we know something from Mackenzie's description; it may have a course of 150 miles, through a mountainous but well wooded and fertile region, and derives a milky tint from the calcareous rocks which form its channel; it unites with the ocean at Bentinck's Corner: of the second we know little, but that it rises, like Frazer's

River, in a chain of irregular swampy lakes on the western slope of the primary watershed; while Salmon River has its sources in the mountains which form the western limit of the basin of Frazer's River; hence the difference of climate, productions, and physical character generally.

To the south of the Columbia, two rivers, Umqua and Klamath, have their sources in the Blue Mountains; the latter is a considerable stream, may have a course of 500 miles, and flows through a lake of the same name; one of its affluents from the right, the Shaste, has its rise in the most elevated peak of that range, which is so called. The country through which these rivers flow is of the same character as that about the lower course of the Columbia.

Separated from the Klamath by the Sierra Nevada, the Sacramento flows southward through the narrow valley formed by the mountains of the central basin and the coast range; this is of equal beauty and fertility to the valley of the Columbia, and somewhat more southern in climate and productions, its course may be nearly 500 miles, of which 150 are navigable, it has numerous small affluents; its valley has become remarkable for the gold found in it; it unites with the San Joaquin, which flows through the more level country to the south, and expands into the marshy lakes called Tule, having a course of less, probably, than 200 miles; after their confluence they fall into the Bay or Gulf of San Francisco, which extends fifty miles from east to west, and nearly three times that distance from north to south, forming one of the finest and most extensive harbours in the world.

Of the Colorado, which flows from the Rocky Mountains southward into the Gulf of California, we know little, except that its length probably exceeds 750 miles, and that its rapid torrent entirely precludes navigation; with this river near its mouth, the Gila is confluent; it has a westerly course of about 400 miles.

## CHAPTER XXIX.

### THE RIVERS OF THE CENTRE.

- § 1. The Mackenzie.—2. The Saskatchewan.—3. The Mississippi and Missouri.—4. The rivers of the Gulf.

**THE Mackenzie.**—In contradistinction from the great rivers of Northern Asia, Northern America presents an intricate network of streams, connecting extensive sheets of water, some of which rank among the largest lakes in the world; these may be divided into two systems, that of the Mackenzie on the north, having also an outlet by the Churchill River to Hudson's Bay, and of the Saskatchewan on the south, the outlet of which is by Nelson and Severn Rivers into the same bay.

Of the streams which unite to form Mackenzie River, Athabasca Lake is the first receptacle; this is about 250 miles long by forty broad, and receives from the west the waters discharged by the Peace and Athabasca Rivers from Lesser Slave Lake; from the south, the surplus waters of Methye Lake, and from the east, those of Woollaston and Deer Lakes, Deer and Methye Lakes both communicating with the Churchill River by the Mississippi. Peace and Athabasca Rivers have both their superior sources in the Rocky Mountains, as already noted; the former may have a course of 500 miles to Lake Athabasca, and receives several affluents; the latter is not so long, and its affluents are inconsiderable. Lesser Slave Lake may be forty-five miles in length by ten in breadth; Methye Lake has about the same extent, and is connected with many other smaller lakes: Woollaston and Deer Lakes are larger. Great Slave Lake, the second basin of the system of the Mackenzie, is 300 miles long by fifty broad, of very irregular shape, receiving numerous streams, of

which Hay River, from the south-west, is the most important, connected with numerous smaller lakes, of which the most important are Aylmer, Clinton—Golden Lake, and Artillery Lake, forming a chain on the north-east: it has also several islands. The channel connecting Athabasca and Slave Lakes is called Slave River; it is broken by falls and rapids, but well wooded in its upper course: Great Slave Lake discharges its surplus waters from its western angle, and the stream is shortly after met by the Turnagain River, which has its rise from several sources in the eastern spurs of the Rocky Mountains; of these Dease River, rising from Dease Lake, may be the most important. The Turnagain may have a course of 500 miles, and at its confluence the Mackenzie becomes a considerable river, and after flowing about 200 miles, receives the surplus waters of Great Bear Lake from the east by the river of the same name. This lake, of very irregular form, stretches its arms from north-east to south-west about 250 miles, and from east to west nearly to as great an extent: it is only 230 feet above the sea.

From the junction of Bear River the Mackenzie pursues a tortuous course of more than 200 miles to the sea, which it enters by several mouths, through a very extensive delta, with islands formed and in process of formation, stretching far out to sea: and here it is joined by the Peel and Rat Rivers from the south and west; these are not considerable in size, but are navigable, and have their sources in the limestone and sandstone ranges which form the western limit of the lower basin of the Mackenzie.

To the east of the Mackenzie and its tributary waters, the Coppermine River falls from Point Lake into Coronation Gulf; the range of rocky heights which separate the basins is known by the same name: it may have a course of 250 miles; and further eastward Back's River, the Thlewcechdesh, or Great Fish River, rushes through rugged channels, dashes over rocky barriers, and expands in still lakes until it reaches the sea at Franklin Inlet; while to the south numerous lakes, for the most part connected, the principal of which is Doobaunt, discharge their surplus waters into Chesterfield Inlet and Hudson's Bay.

2 *The Saskatchewan* has its rise from two principal sources, as already noted, in close proximity to the northern sources of the Columbia. Its name, implying swiftness, is applicable to its upper courses, but in its lower course, after the confluence of its two streams, and from thence to Lake Winnipeg, it is scarcely so, except during the freshets in the spring. The course of this river is very tortuous, especially as it approaches the lake, and may be estimated as not less than 2000 miles, for more than 1000 of which it is navigable on the northern, and it is said for 1500 on the southern branch; of this, however, but little is known, the usual path of the fur traders to the valley of the Columbia being to the north: this much, however, we do know, that navigable throughout nearly its whole length, it flows through a very fertile and, in its upper course, well wooded country; and in this it is to be distinguished from its lower course, where, as it approaches the lake, it assimilates to the character of the lake district.\* It may here be remarked, that if a line be drawn between the lakes on the east and the rivers on the west, it will separate two very distinct districts, the former cold and marshy, frozen up for from five to seven months of the year, with stunted vegetation, if not altogether barren; the latter increasing in beauty, fertility, as well as in temperature, as the Rocky Mountains are approached and the ascent of their outlying spurs is made, the line of woods and active vegetable life extending to the mouth of the Mackenzie.

Of the valley of the Saskatchewan, the descriptions given, especially those of Sir George Simpson, raise to a very high pitch the estimation of its natural capabilities; it is said also to possess extensive deposits of coal; lignite, we know, extends along the whole of the western slope of the valley of the Mackenzie. Lake Winnipeg extends from north to south nearly 300 miles, but does not, probably, average more than fifty in breadth: besides the Saskatchewan, it receives the waters of Red River and Winnipeg River from the

\* See Palliser's Expedition, *Proc. R.G.S.*, vol. II.

south, as well as the surplus waters of Lakes Winnipegosis and Manitoba from the west; the former of these may be 125 miles long, the latter 100. Red River rises near the sources of the Mississippi, and its western affluents approach so closely to the basin of the Missouri, and are separated from it by so slight an elevation, that, during the spring freshets, the waters of the southern are said to have found their way into the more northern basin. The Red River may have a course of 250 miles; its principal affluent is the Assiniboine, from the west: its valley is in character, as in position, intermediate between that of the Saskatchewan and the affluents of the Mississippi.

Winnipeg River is as yet little known; it is broad and rapid, broken by numerous, it is said twenty-five, falls, dividing into many channels, receiving several important affluents; its course is for the most part through ravines of lofty primitive rocks, which change to limestone at its mouth; it flows from the lake, or, perhaps, rather three lakes, known as the Lake of the Woods, an irregular and extensive sheet of water, rocky and well wooded to the north, but low and sandy to the south, and very shallow: this lake is connected with lake La Pluie, also of irregular form and uncertain size, by the beautiful valley of the river of the same name: and this lake is again connected, by Namaycan Lake and the river St. Croix, with two chains of lakes, from which Pigeon River on the south, and the Kaministiquia on the north, fall into Lake Superior: it is not certain, but highly probable, that these lakes are all connected with each other: the southern lakes and rivers are cold and barren; the Kaministiquia and northern lakes are of the same character as La Pluie. Winnipeg River receives the surplus waters of Red, Sal, and other lakes by English River.

Nelson River is a broad, deep and rapid, but broken stream, with a course of 250 miles; it receives considerable accession of waters from lakes to the south. Severn River is longer, but has not so large a volume of water; it also receives an accession to its waters from the south, Cat Lake overflowing to the north into the basin of the Severn, and to the east into that of the Albany, which falls into James's Bay at the bottom of Hudson's Bay. Several rivers of similar character fall into the bay from the south and east, one of which, the Abbitibbee, has its source in a lake of the same name, in close proximity to Lake Temiscaming, one of the principal sources of the Ottawa.

3 *The Mississippi and Missouri.*—The estimate in the recent census of the United States gives the area of this vast basin as 1,217,562 square miles, or nearly 250,000 more than the usual estimate: 1,500,000 may be a near approximation to that of the basins of the rivers discharging themselves into the northern part of the Gulf of Mexico. The mouth of the Kansas River is nearly in the centre of this basin, which will average 1200 miles in length by 1500 in breadth: this central point is however nearer to the eastern coast of the continent by 250 miles than it is to the western. The primary sources of this great river are, of course, in the primary watershed of the country, the Rocky Mountains; but, as in the case of the Danube, Ganges, and other primary rivers, the secondary source, earlier and better known, has given its name to the united stream.

The Missouri is usually said to rise from three sources, to which their discoverers, Lewis and Clarke, gave the name of Jefferson, Madison, and Galatin; not impossibly others may hereafter be found with better claims to the honour; of these, however, the former, which lies to the south-west, has its origin in a comparatively small elevation, in a pass of easy access in the Rocky Mountains, close to the sources of the Salmon River, already named as an affluent of the Columbia. The upper waters of the Missouri flow through fertile and well wooded valleys, separated by the northern spurs of the Wind River range, but after being contracted in their lower courses by limestone cliffs, open out into "extensive and beautiful meadows and plains" surrounded by distant but lofty mountains: below these the channel is again contracted, does not exceed 200 yards in width, and the river has a tortuous and rapid course, interrupted by numerous rocks and islands; still lower, its waters, now



shallow, expand to more than a mile in width, and flow through a beautiful valley hemmed in by rocky precipices; these again contract the channel below, forming the gates of the Rocky Mountains, as named by the same travellers; here cliffs of black granite rise perpendicularly 1200 feet from the water's edge; the river, narrowed to 350 yards in width, rushes in one deep, heavy mass through the chasm, which extends for above four miles in length; and here the mountains are comparatively barren, yielding only small copses of cedar, pine, and willow; below this the river has an irregular and varied course, is rapid and narrow for about 100 miles to the great falls, where there are indeed a series of falls and rapids: a fall of five feet is followed by one of twenty-six feet, and again another of forty-seven feet, extending in an unbroken line across the river, which is here 470 yards wide; again there is an irregular fall of nineteen feet, and subsequent falls of five and two feet, with rapids between them, all resulting in a total descent of 352 feet in two miles and three-quarters, according to Clarke's estimate, but both above and below this limit there are rapids. It is below the Great Gates that the river justifies its name of Missouri, or Muddy River, which it maintains from thence to its outlet in the Gulf of Mexico: below the falls it also maintains the same character, flowing in a deep and tortuous channel through a boldly undulating country. It receives the waters of numerous tributaries; of those from the right, the Yellowstone and Platte are the principal; these rising, like the parent stream, in the Rocky Mountains, have the same character above the canons or defiles, through which they also find their way into the great plains or prairies which extend from the base of the Rocky Mountains to the united streams of the Missouri and Mississippi, they are mountain torrents, below these slow streams wind in deep channels. The other affluents of the right partake of the character of the lower course of the Yellowstone and Platte, while the affluents of the left assimilate to that of the Red River and southern affluents of the Saskatchewan, rising for the most part in lakes and swamps, amidst cedar, willow, and alder thickets, trees which appear only at scattered intervals on the southern waters.

The Yellowstone and Platte have their sources in close proximity, near the southern pass described by Fremont, rising from numerous streams, which for the most part originate in lakes hidden in verdant amphitheatres in the mountains; their upper waters present scenes of beauty peculiar perhaps to those localities; the line marked by the canons is a rocky sterile desert, with scarcely any vegetation but the cactus, and eastward extend the rolling grassy prairies for 500 miles. Long's Peak marks the southern sources of the Platte, and here to the west, south, and north, the Colorado, Arkansas, and Platte, have their principal sources in valleys of the same character, but more extensive: the dividing ridge to the westward was ascertained by Fremont to be 11,200 feet above the sea. The Yellowstone is however less broken in its course than the Platte or Missouri; its length may be 1500 miles; its principal affluent is the Big Horn; from the right it has numerous others of less importance. The Platte, or Nebraska, has a course of 1600 miles; its principal affluent is also from the right, rising near Long's Peak; it has other affluents, the most important of which is the Iowa from the left. The Little Missouri, Chayenne, White, Qui-court, and other streams, fall into the Missouri from the right, between the Yellowstone and Platte. The Kansas, rising from three sources, drains the country between the latter river and the Arkansas; its course is estimated at 1200 miles, and it is navigable for 900: below the Kansas the Osage also joins the Missouri from the right. The affluents from the left are small; of these the most important are the Maria, leading to the pass by which Captain Clarke returned from the valley of the Columbia, North Mountain Creek, Milk, Porcupine, and White Earth; these do not probably exceed 200 miles in length; and after the main stream takes a southerly direction, the Jacques, Sioux and Grand Rivers, which are larger, and may extend to 500.

To the falls of the Missouri the general course of the river is to the north, from thence to the confluence of White Earth River, in direct distance about

500 miles, it has an irregular westerly course, and from thence takes a south-west direction to the junction of the Mississippi; at the junction of the Yellow-stone it is 2600 feet wide, and is navigable for 2500 miles above the confluence of the Missouri, the length from the source to that point being estimated as more than 3000 miles; there is but little timber on the banks of the Missouri above the mouth of the Platte.

The principal source of the Mississippi is now considered to be Lake Itasca, the elevation of which is only 1500 feet above the sea, and which, like the other lakes in its vicinity, is remarkable for its placid sylvan features; it is about eight miles in length, situated between Red River and the lakes which connect themselves with Winnipeg River and the rivers falling into the head of Lake Superior, from which it is distant about 170 miles. It is one of many similar, from which numerous streams flow into the Mississippi and its tributaries, as well as into the more northern waters. These streams uniting, the main body of water is broken by the falls of St. Anthony, which form the limit of the navigation of 1200 miles from the Gulf of Mexico, the network of streams and lakes above affording canoe and boat navigation between the Mississippi and rivers to the north. The falls of St. Anthony are only sixteen feet in height, the river being here divided into two channels; below the falls, the St. Peter's or Minnesota River joins the main stream from the right, from which side the upper Iowa and Lemoine are also affluent. St. Peter's River has its source in a small lake called Polecat Lake, about three miles in circumference; after a course of fifteen miles it flows through Bigstone Lake, which is about twenty-five miles in length by one in breadth, being an expansion of the stream, as are Lac Qui Parle and others. This river has a course of 500 miles, and is navigable for barges to the head of Bigstone Lake, above which it is obstructed by falls and rapids. The valley, of an average breadth of one mile and a-half, though full of small lakes and swamps, is covered with a heavy growth of hard-wood, oak, elm, maple, ash, lime, walnut, and luxuriant undergrowth of vines, shrubs, and grasses; it may be esteemed typical of the affluents of the Mississippi above its junction with the Missouri. The principal affluents of the Mississippi from the left are the Wisconsin, Rock, and Illinois; the former affording communication with Green Bay and Lake Michigan, and the latter being the natural route from that lake to the Mississippi. The upper valley of the Wisconsin is hilly, on the north rugged and broken, yet not rising more than 2000 feet above the sea. The Illinois has a course of 300 miles through heavily timbered valleys, rising in rounded slopes and bluffs covered with herbage.

The valley of the Mississippi below the falls varies from ten to twelve miles in width, is bounded by high bluffs, generally abrupt, often precipitous; at De Moyn and Rock Rapids it is contracted to the breadth of the river, or about 1000 yards; below this the valley widens, and is remarkable for the insulated hills with which it is studded, rising from 100 to 500 feet; the stream is wide, spreading to five or six miles, and forming channels among numerous islands. Lake Pepin is a beautiful enlargement of the river twenty-two miles long, three miles wide, unbroken by islands, and of great depth. The surface of the valley of the Mississippi is varied with wood and prairie.

Below its confluence with the Missouri, the Mississippi flows for about 200 miles without receiving any considerable affluent. The Ohio, which may almost be considered one of three confluent rivers, uniting to form the vast flood which from thence rolls its heavy waters to the ocean, now joins the main stream from the east, draining the entire basin between the southern watershed of the Great Lakes and the Gulf of Mexico, which, uniting with the Alleghanies, afford an amphitheatre of 200,000 square miles in area, and affording by its tributary, water communication with the lakes and St. Lawrence as well as the Atlantic; this may be well considered the most important of the affluents of the Great River; it is no less so from the beauty, fertility, and varied productions, whether mineral or vegetable, which it offers to the use of man.

The Ohio is formed by the junction of the Alleghany and Monongahela

mountain streams at Pittsburg, at an elevation of 830 feet above the sea; its course from thence for 300 miles is through hilly country, from which it breaks in rapids, and thence forms a navigable river, increasing from 500 yards to half a mile in width; the extent of navigation afforded by this river and its tributaries is estimated at 5000 miles. The principal of these are the Big Beaver, Muskingum, Scioto, Miami, and Wabash, from the right; and Kenawha, Sandy, Licking, Kentucky, Green, and Cumberland rivers, from the left. These are navigable, the former from 100 to 300 miles, and the latter from 250 to 400 miles. The Tennessee, also from the left, is the most considerable affluent of the Ohio, which it joins ten miles below the Cumberland; it is at the mouth 600 yards in width; its total course is estimated at 1200 miles; it is navigable for large vessels for 260 miles, for vessels of fifty tons for 200 more to the bottom of the falls, by which it is precipitated from the mountains in which it has its rise, and for boats altogether for 1000 miles; its affluents are numerous but unimportant, as, falling from the short slope of the watershed of the Gulf of Mexico, they have neither length nor volume of water.

From the mouth of the Ohio the Mississippi averages 900 yards in breadth and 100 feet in depth; on the left it bifurcates and receives no affluent of importance; on the right the Arkansas and Red Rivers drain the eastern slopes of the Ozark Mountains and the plateaux between them and the Rocky Mountains, in whose defiles they have their rise; of these rivers little is known beyond the facts that, while they do not differ in general character from the Platte, their course is more irregular, and the valleys more broken, varied, and better wooded. The basin of the former is estimated at 175,000 square miles in area, and its length as exceeding 2000; it has several large affluents, of which Red and Saline Forks and the Canadian River, formed by two confluent streams, are the most important; these cannot be less than from 700 to 1500 miles in length. Red River, known also as the Nachitoches, and in its upper course as Escararedra, has its rise among the south-eastern spurs of the Rocky Mountains, close to those of the Rio Bravo del Norte; its total course probably exceeds 1500 miles, much of which would be navigable, but is obstructed by timber brought down by the freshets from the mountains; steamers can ascend it for 400 miles; it has several affluents, of which the Washita is the most important, and expands into more than one considerable lake.

The delta of the Mississippi, as it is one of the most extensive, so it is one of the most remarkable in the world, and that not only from its natural characteristics, but from the scientific research and labour which have been bestowed upon it. It extends about 200 miles in length and breadth, being larger than that of the Nile, and of about the same extent as that of the Ganges; its characteristics are the preservation of its importance by the main stream, notwithstanding its bifurcations and the branches by which its waters also find their way to the sea; and the consequent extension of its mouths in the form of an irregular triangle to a considerable distance beyond the main body of the delta. The principal of the branches and bifurcations are the Atchafalaya, which commences 200 miles from the sea, the Plaquemine and Fourche on the right, and the Iberville, Gentilly, and Bienvenu on the left; the former receive several streams, as the Rouge and Tché, and spread into numerous lakes and lagoons varying from five to twenty feet in depth, and the latter communicate with Lakes Maurepas and Pontchartrain, which separate the lower part of the delta from the main land on the east; Lake Pontchartrain is forty-five miles in length and twenty-three in breadth, communicating with Lake Maurepas on the west, and by Lake Borgne with the sea on the east, as well as with the main stream by St. John's Channel, or Bayou, which is the local name for these branches, whether bifurcating or otherwise. The rise of water in the inundation is twenty feet at the head of the delta, and forty near the sea, and its power is restrained here, as elsewhere, by vast dykes, or levées; it is said to cover an area of 400,000 square miles. The peninsular prolongation at the mouth of the river has been probably

over-estimated as extending at the rate of 1150 feet annually; at present there are five principal mouths, of which the most important is that of Balize, having only from thirteen to sixteen feet of water. The sands of this delta are more shifting and variable than of most others.

The rivers falling into the Gulf of Mexico from the reverse slope of the basin of the Mississippi are numerous, but comparatively neither large nor important; the most worthy of notice are to the east, the Cactalochee, Alabama, and Pearl. Of these the Alabama is the largest, rising from two principal sources, the Coosa and Talapoosa among the southern spurs of the Alleghanies; it has a course of about 600 miles, receiving, as it approaches the sea, the waters of the Tombidgee, having a course of 300 miles, from the right; the estuary formed by these rivers is known as Mobile River: they are navigable through a great part of their courses. The larger rivers to the west are the Trinidad and Brazos; these have their rise in the reverse slopes of the easterly extension of the Rocky Mountains, which are continued in the Ozark chain. They are rapid in their upper courses, but flow through level lands as they approach the sea, and thus even the smaller streams, as the Sabine, the course of which is not 200 miles, are navigable. The Trinidad has a course of 450 miles, and falls into Galveston Bay. The Brazos in length approaches 1000 miles, and has considerable affluents; it is navigable, but deficient in water, and has a bar at the mouth; the country through which it flows is saline, but very favourable to the growth of cotton. Besides these the Saint Antonio and Neuces may be mentioned. The Colorado or Red River of Texas has throughout its course the rapid and irregular current, which the others have only in their upper courses, and though a large river, is not navigable. It rises among the spurs of the eastern extension of the Rocky Mountains. It is probably 750 miles in length: it has several affluents of similar character, which are still more developed in the Rio Grande del Norte, or Bravo del Norte, which, rising among the defiles to the east of the Great Salt Desert, flows through a narrow and rugged valley, separating the plateaux of Anahuac and Mexico from the great basin of the Mississippi. The sources of this river are, as already noticed, in close proximity to those of the Platte, Arkansas, and Colorado, and separated by the latter from those of the Columbia. For one-half of its course of nearly 2000 miles it is, notwithstanding its size, a mountain torrent; it has numerous affluent streams from the ravines transverse to that through which it flows, but the only affluents of importance are in its middle course, viz., the Puercos from the left, and the Chonechas or Florida, which rises among the defiles of the Sierra Madre, from the right. The Sabine from the right is the principal affluent of its lower course; its mouth is impeded by a bar.

## CHAPTER XXX.

### THE RIVERS OF THE EAST.

§ 1. The St. Lawrence and the lakes.—2. The watersheds of the east.—3. The rivers of the north-east.—4. The rivers of the south-east.

**T**HE *St. Lawrence and the Lakes*.—The basin containing these inland seas of fresh water is perhaps the most remarkable in the globe, containing by far the largest mass of fresh water, and affording means of communication unrivalled: taking 300,000 square miles as the area of the whole basin, and 100,000 square miles as the area of the lakes, they may be further estimated to

have a coast line of perhaps 7500 miles. Assuming the St. Louis, to be the principal source of the St. Lawrence, estimating its length 120 miles, the strait of St. Mary 40, the St. Clair River and Detroit Lake 75, the Niagara 33, the St. Lawrence from Lake Ontario to the sea 650, and the length of the lakes 1355 miles; the total length will be 2273 miles, of which nearly the whole is navigable.\* But of the numerous small rivers which fall into Lake Superior, few of which are known, there may be, and probably are, others equal in size to the St. Louis; of more importance certainly are the Kaministiquia and Pigeon Rivers, which flow into the lake more to the north, as connected with the chain of lakes and streams which, with only a slight interval, unite Lake Superior to Lake Winnipeg, and the waters of the Arctic Sea and Hudson's Bay with those of the Atlantic Ocean. These, and the other rivers of the western side of Lake Superior, either rise in or expand into lakes, and the surface of the country presents more water than land. The rivers run through rocky channels, and are broken into numerous and often lofty cascades; of these the Kakabekka Falls of the Kaministiquia are perhaps the most remarkable. They are 130 feet in height and 150 yards in breadth. The valley of this river is also remarkable for its beauty and fertility, presenting an undulating surface, covered with verdure. Generally speaking, these rivers partake of the character of the lake, which from its shape alone would appear to occupy deep fissures in the rocks which surround it. Those to the north and west are primitive and igneous, not only granite and gneiss, but basalt, trap, and slate being found in abundance, and the lakes and rivers varying in character and scenery according to the rocks which form their basins. Lake Superior is formed of two principal basins, the larger and western being 230 miles long from south-east to north-west, and 60 miles broad. The north-west shore is for half its length a wall of porphyry and greenstone, broken only by ravines, through which small rivers fall into the lake, and having deep water at the base. To the north, however, there are deep sounds and numerous islands. Thunder, Black, and Neepon Bays receive respectively the Kaministiquia, Black, and Neepon Rivers, the latter being ninety miles long, and flowing from a lake of the same name about twenty miles in diameter. In these bays, although the capes and islands which form them are rocky and precipitous, the former rising from 1000 to 1500 feet, yet the shores and mouths of the rivers are low, fertile, and covered with trees. Isle Royale, the largest island in the lake, lies off the south of Thunder Bay, parallel to the shores of the lake, from which it is distant thirteen miles; it is forty miles long by eight broad, and formed of porphyry, greenstone, and sandstone on the west, north, and north-east, and of sandstone and conglomerate on the south-east, and similarly on the south side of the lake; the shores and islands are of sandstone, from the mouth of the St. Louis to Keewaiwoona promontory, which forms the natural division of the lake on the south, and again extend to the east of that point, mixed with granite as far as the river St. Mary, which connects Lake Superior with Lake Huron. The northern shore consists of greenstone and porphyry on the west, and granite on the east; slate appearing near the centre in a group of islands named from that circumstance.

\* Reports to the Congress of the United States give the following statements:—

Lakes.	Length in miles.	Breadth in miles.	Mean depth, feet.	Eleva- tion, feet.	Area, miles.
Superior	355	160	900	627	32,000
Michigan	320	100	900	578	22,000
Huron	260	160	980	574	20,400
Erie	240	80	84	565	9,600
Ontario	180	35	500	232	6,300

The total length, 1355 miles; area, 90,300; total area drained, 335,515.

The eastern division of the lake may be 120 miles in diameter, varied on the south-west by Keewaiwoona Bay, and on the north-east by Nishipicoten harbour, which receives a river of the same name, perhaps the most important of the numerous streams which here add their waters to the lake, and which is navigable for boats fifteen miles to the falls. This harbour is also covered by a rocky island, also named Nishipicoten, fifteen miles long by five broad, producing a luxuriant growth of hard-wood timber. A small sandy island called Caribou lies directly in the centre of the lake towards its eastern extremity; here it forms a deep bay, about twenty-five miles in width, from the bottom of which, between cliffs of porphyry 790 feet high, it discharges its surplus waters into Lake Huron by the river St. Mary. Twelve miles from Lake Superior the river falls over ledges of sandstone, eighteen feet in height, three miles below which it expands into Lake George, ten miles in width, which is divided by Sugar Island for fourteen miles, and subsequently forms three channels between Neebish Island, the south point of Sugar Island, and St. Joseph's Island; the former seven miles long, and the latter seventeen long by thirteen broad. This island occupies a bay at the western extremity of Lake Huron, of triangular shape, and measuring in base and perpendicular about twenty-five miles.

From this point the range of the Manitoulin Islands covers the northern coast to Georgian Bay, while to the south and west the Strait of Michilimackinac opens into Lake Michigan; from north-west to south-east Lake Huron measures 200 miles: Sagana Bay extends to the south forty, and Georgian Bay to the north-east about 100 miles.

The southern and western shores of this lake are for the most part fertile and well wooded; the western shore, as it approaches St. Clare River, is however poor and sandy. This lake differs from Lake Superior, in presenting limestone as its characteristic rock, which, appearing to the south in some islands, constitutes the mass of the islands to the north, as well as much of the coast, though on the main land to the north, and especially the Cloche Mountains to the north and east, granite and quartzose rocks prevail. The northern shore of the lake is extremely rugged and irregular, and covered with innumerable small islands, independently of the Manitoulin chain, which is formed of four principal islands: Drummond's, Cockburn's, the Grand Manitoulin, and Fitzwilliam's, or Horne Islands. These are of extremely irregular form, broken by sounds and inlets, having deep water on the north, where the cliff rises 200 feet, but shoal on the south sides, and extending in a curved line from east to west. They are picturesque, fertile, well wooded, and well watered. The largest, Grand Manitoulin, is eighty miles long, with an average breadth of twenty miles; in it are several lakes, one of which, having an area of fifty-five miles, has no outlet for its waters, and receives only one small stream. Drummond Island may be eighteen miles long by ten broad, and the others smaller.

The most considerable river falling into Lake Huron is French River, which flows from Lake Nipissing. It is however rather a chain of small lakes than a river, and has four principal outlets to the lake. Lake Nipissing is sixty miles distant from Lake Huron, and only about seventy feet above its level. This river and lake are situated in a cold and barren country, but those to the westward, Thessalon, Mississagui, Serpent, and Spanish Rivers, flow through fertile, well wooded, and beautiful valleys. Between French and Spanish Rivers the Cloche Mountains, a spur from the northern watershed of the basin of the lakes, approach the shore, and form the limit between the fertile and unfertile portions of the country.

Eastward of the Manitoulin Islands, Georgian Bay stretches deep into the land towards Lake Ontario, and receives the Severn River from Lake Simcoe; this river has many falls and rapids, but flows through a beautiful and fertile country. Lake Simcoe approaches within thirty-five miles of Lake Ontario; it is 170 feet above Lake Huron, is thirty miles long by eighteen wide, but of irregular shape, forming deep bays to the west and south—viz., Kempenfelt

and Cooke's Bays; the latter receives the waters of Holland River, which rises in the hills to the south, and is navigable for ten miles, and its sources are close to those of the Humber, which falls into Lake Ontario. The banks of this lake are low, but fertile; it has numerous islands, and is separated by a narrow strait from Lake Gougitchin. It is usually frozen over in winter. Lake Gougitchin is twelve miles long by five broad, of very irregular shape, and presents extremely romantic scenery.

The southern extremity of Georgian Bay, Nottawasaga Bay, receives the river of the same name, which flows through a highly picturesque and fertile country, has numerous affluents, but is not navigable.

The river St. Clair connects Lake Huron with Lake St. Clair, which is again connected with Lake Erie by the Detroit, or, as it is called, Detroit River. St. Clair River is twenty-five miles long, and about one mile wide; its course is nearly north and south; its navigation is impeded by sandbanks, and it enters Lake St. Clair by five mouths, and forms a delta which has filled up nearly one-half the lake; of the islands thus formed, Walpole and Harson's, separated by the principal channel of the river, may be noticed. Formerly three channels connected the two lakes, but the two northern became dry, and have given to the northern shore a good harbour.

Lake St. Clair is twenty-five miles broad, and from the entrance of the Detroit to the mouth of the St. Clair is the same distance; it does not exceed thirty feet in depth; it receives several rivers, of which Sydenham and the Thames, from the east, are of most importance. The former, known as Bear Creek, has a course of about seventy-five miles; the latter has a slow and serpentine course of 160 miles through a very fertile valley, receives numerous small affluents, and is navigable for boats throughout nearly its entire length. The Detroit is twenty-three miles long, and from one to two broad; it issues from the south-west angle of Lake St. Clair, and flows south-east and south into the north-west angle of Lake Erie, which here forms a deep bay, about thirty miles across, separated by projecting points and islands from the main basin; there are also several islands, some of considerable size, in the river. Lake Erie has this peculiarity, that while the Detroit flows into its western extremity from the north, the Niagara flows out of its eastern extremity in the opposite direction. Thus lying to the south of the other lakes, it seems to occupy a shallow basin in a plateau raised above the bottoms of those which have independent channels of communication to the north. The river Thames, flowing nearly parallel to its northern shore for half its length, has no considerable streams from that quarter. The shore to the north is indented by four wide bays, separated by low, marshy, projecting points, of which Point Pelée on the west, and the North Foreland on the east, mark the three principal divisions of the lake's surface. Point Pelée Island is about six miles long by three broad, the others smaller. The Ouse or Grand River falls into Lake Erie about half way between the North Foreland and Niagara River; it rises to the north-east of the sources of the Thames, and has a course equally tortuous, but probably longer, receiving numerous small affluents, and flowing through a fertile valley.

The Miamis River is the most considerable which falls into the lake from the south by the bay of the same name; it is navigable for small craft, but the near approach of the southern watershed of the basin to the south shore of this lake leaves no room for affluents of any size; indeed, the sources of the northern affluents of the Ohio are in close proximity to it, and afford means of communication between it and the Mississippi.

The Niagara River is thirty-four miles in length; on leaving Lake Erie it is less than a mile wide, but spreading into two wider channels, separated by several small islands, it then encircles an island of irregular shape, about seven miles long and six broad, below which the Niagara would have the aspect of a lake but for the rapidity of its current; and here Chippewa Creek, by which communication has been opened with Lake Ontario, falls into it from the west. To this point the river is navigable, and to this from Lake Erie

the fall is only fifteen feet, while from this to the Great Falls, a distance of only half a mile, it is fifty-one feet, the falls being on the east 164 feet, and from the base to Lake Ontario 106, in all between the lakes 336 feet. The falls are nearly equidistant between the lakes; they are divided by an island, called Grand or Iris Island: that on the west, called the Horse-shoe Fall, is 1900 feet wide and 158 feet high; that on the east 920 feet wide and 164 feet high, the entire width of the river being about 4000 feet. The recession of these falls is probably more rapid than is usually supposed, very considerable portions of the rock having fallen within the memory of man; this is not to be wondered at when 15,000,000 of cubic feet of water have been estimated to pass over it every minute.

Lake Ontario is of regular shape towards the west, but towards the east is broken by a deeply-indented peninsula, known as Prince Edward's county, enclosing what, under other circumstances, might be called the estuary of the River Trent; still further east the mouth of the Catarqui forms another inlet, as do Blackwater Bay, and Chalmont Bay on the south side; and the eastern portion of the lake is studded with islands, the principal of which, Amherst and Wolf Islands, are respectively ten and fifteen miles in length, the latter of very irregular form, and lying in the embouchure of the lake. This lake is remarkable for its natural facilities of communication with Lake Huron on the west and the River Ottawa on the east, the former by the River Trent and the latter by the Catarqui.

The River Trent may be said to have its rise from Balsam Lake, and to pass through Sturgeon, Pigeon, Shemong, Shebantekon, and Trent Lakes; between the latter and Rice Lake it is known as the Otonabec, and below that as the Trent. Within about two miles of Balsam Lake, Talbot River rises, which flows into Lake Simcoe, from which the Severn falls into St. George's Bay of Lake Huron. These lakes are of very irregular shape, and vary from five to fifteen miles in length; they receive many small streams, and are all navigable. The Trent in its tortuous course forms numerous islands, some of considerable size; its valley is fertile, and rich in mineral wealth. Like the Trent, the Catarqui is connected with an extensive though smaller chain of lakes; but the country through which it flows is colder, and less fertile, being formed principally of primitive rock.

Lake Erie also receives considerable affluents from the south; of these the Genessee and Oswego are the principal. The former has a course of 150 miles, broken by a beautiful fall of 226 feet, the latter is formed by the confluence of the Seneca and Oneida Rivers; these flow through two lakes of the same names, which are connected with many others. Oneida Lake is twenty-three miles long by six broad.

From the eastern extremity of Lake Erie, the St. Lawrence issues at Frontinac or Catarqui, and extends in the Lake of the Thousand Islands, for thirty-nine miles; here the beauty and variety of the scenery cannot be surpassed: the islands number 1692; and below this, until within fifty miles from the confluence of the Ottawa, the river is broad, deep, and easily navigable: rapids here break its course for nine miles, below which again the river forms two wide expansions known as Lakes St. Francis and St. Louis, which are separated by rapids called the Cascades, and are also studded with islands; they are respectively twenty-five miles long by five broad, and twelve miles long by six broad; the latter unites with the Lake of the Two Mountains, formed by a similar expansion of the mouth of the Ottawa River.

This, the largest affluent of the St. Lawrence, may be estimated as having a course of 500 miles, but from Lake Temiscaming to its mouth is 350, below which, like the main stream, it is alternately broken into rapids and cascades, or swells into lake-like reaches; of these latter, Lake Chaudière is eighteen miles in length; from which it issues in the falls of the same name, sixty feet in height and 500 yards in width, from which point the river is navigable for fifty miles to the Long Sault, below which it expands in the Lake of the Two Mountains.



Below the confluences of the Ottawa, two larger islands lie close to the northern bank, Isle Jesus and Montreal, the one twenty-two miles long and six broad, and the other thirty-two miles long and ten broad; the former is low, the latter rises to the south in the hill from which it takes its name; both are fertile, the latter so much so as to attract the particular attention of the first discoverers; its position is politically and commercially of the first importance: forty-five miles lower down the river again expands in Lake St. Peter, and it is here more shallow, yet vessels of large burden can ascend to the Island of Montreal: a group of islands extends for nine miles in this lake.

The St. Maurice River, rising in Lake Oskelanaio, leaps from the high table land to the north of the St. Lawrence over a precipice 150 feet high, and flows for much of its course between lofty and rugged cliffs; its lower course is, however, fertile; its mouth is divided into three channels by two islands, and hence it is known as 'The Three Rivers;' to this point the tidal wave ascends the St. Lawrence: its total course is 150 miles. Smaller, but similar in character, are the Jacques Cartier, Portneuf, St. Anne's, and Batiscan Rivers, St. Charles, Gouffré, Mal Bay, Petite Rivière, and numerous affluent streams which join the main river from the north; one, however, the Saguenay, must be excepted, which has rather the character of a deep inlet than an affluent stream, and is navigable for more than sixty miles for the largest vessels, being indeed deeper than the St. Lawrence itself; its extremity forms two deep bays, one of which, Ha Ha Bay, is capable of containing a large fleet, and here cliffs of sienite rise 500 feet above the river; into the other the surplus waters of Lake St. John flow by two channels. This lake is about fifteen miles in diameter, and receives the waters of several affluents which rise in proximity to the head waters of the St. Maurice, the Batiscan, and the rivers falling into Hudson's Bay.

The affluents of the St. Lawrence from the south are more important as flowing through a more fertile country, and opening communication with the rivers to the south and the shores of the Atlantic. Of these, the Richelieu flows for seventy miles; from Lake Champlain it is navigable for fourteen miles to the basin of Chambly, and above that again to the lake; its valley is the most fertile of those formed by the affluents of the St. Lawrence. Lake Champlain occupies a long, narrow, irregular chasm among the hills, and stretches from north to south for 140 miles, is in its greatest breadth twelve miles and in its least half a mile; its surface is only 140 feet above the Atlantic, and it is usually frozen in winter. Lake George, at its southern extremity, is about thirty miles long and seven in extreme breadth, and lying among well wooded hills is remarkable for its beauty, even in America, the land of lakes. As Lake Champlain opens communication between the St. Lawrence and the Hudson River, so does Lake Oneida between Lake Ontario and the Susquehanna, the intermediate country being occupied by some of the most lofty mountains in the east of the continent. The St. Francis rises in a lake of the same name and Lake Meudon, near the sources of the St. John, and is increased by the confluence of the Magog River; from Lakes Memphremagog and Massawhippi it has a rapid course of 150 miles, and falls into Lake St. Peter: similar in character is the smaller river Besancour, but the Yamaska has a winding course of ninety miles through a fertile valley. The Chaudière is even more remarkable than the St. Francis for its rapidity and broken course; its great falls, about four miles from its mouth, are well known, and are more than 100 feet in height: the total length of this river must exceed 120 miles; in its upper course it expands in Lake Megantic, its principal tributary is the Du Loup. The Etchemin, a smaller river rising in a lake of the same name, affords that communication which the broken waters of the Chaudière deny; below this the Rivière du Sud flows through a fertile plain, beyond which isolated granite hills indicate the proximity of the mountain district of Gaspé, from which the Mitis and Matane, and other smaller streams, fall into the estuary of the St. Lawrence.

The shores of the St. Lawrence are for the most part bold, excepting

about the mouths of the affluent rivers; its estuary is closed in to the south by rocky mountains rising nearly 4000 feet; on the north, a rocky ridge, but of less elevation, separates it from the table land in which the rivers falling into it from that side have their rise, and from which the mountains of the centre of Labrador rise to probably as great an elevation as those to the south: both districts are cold and barren, covered with lakes and streams, and but little known. The island of Bic, below Green's Island, which is on the south side opposite the mouth of the Saguenay, is the first island in the river; these gradually increase in number and size until, in Isle Aux Coudres and Isle Orleans, they extend to twelve and twenty miles in length; above the latter the river is 1314 yards across, and in the basin of Quebec, two miles below, at the Rivière du Sud, the channel expands to ten miles, at Mount Pelee to seventy-three, and at the mouth to 100; it enters the gulf of the same name by two channels separated by the rocky island of Anticosti, in length 125 and in breadth thirty miles.

2 *Watersheds of the East.*—The watershed of the rivers falling into the Atlantic Ocean, as well as those from the opposite slope into Lake Ontario and the St. Lawrence, is formed by the Alleghany or Appalachian chain and its northern extensions. The general character of this has already been indicated. It may be said to connect the mountains of Labrador on the north with the Ozark Mountains on the south, while in the centre the watersheds of the great lakes uniting, extend to the Rocky Mountains; and on the extreme north the coast chains are continued to the Romainzow Mountains, the north extension of the lower ranges of the Rocky Mountains, which stretch to Cape Barrow, thus completing the cincture of the three great basins of the northern lakes and rivers; of the great lakes in the centre, and the Mississippi on the south; while the principal extension of these mountains must be looked for from the north of Labrador through the Archipelago of the Arctic Sea. On the south coast of the estuary of the St. Lawrence, as already noted, these mountains rise to nearly 4000 feet, and on the south-east Bald Mountain may have the same elevation, while Kataadan, near the Kennebec, presents an isolated peak 5385 feet in height. Between Lake Champlain and Lake Oneida, and the other small lakes which find the same outlet by the Oswego to Lake Ontario, the mountains have an equal or greater elevation, the mean of which may be 3000 feet; but the peaks of Essex and McIntyre attain respectively to 5467 and 5183 feet, and many others are about the same height. Here, on the east, are the sources of the Hudson, and the Juniata on the west may be considered the principal source of the Susquehanna. These ranges unite below Lake Champlain, and extend in three principal and parallel chains, trending nearly due north and south. Here, between the sources of the Connecticut and Merrimac Rivers, the most elevated summits of the whole are to be found; many exceed 5000 feet, and Mount Washington rises in rugged pinnacles of granite and gneiss 6234 feet above the sea: here also is a narrow defile, called The Notch, two miles in length, and bounded on either side by precipitous cliffs. This is a country of lakes and rivers; the valleys narrow, and only fertile where alluvial deposits cover the rocky basin; but it is of the highest picturesque beauty, and much of it remains in its pristine state.

In the south, the Green Mountains divide the waters of the Connecticut from those of the Hudson; they are of less elevation, not exceeding 3500 feet; they are also of more rounded form, and covered with forests and mossy verdure. These mountains are extended towards the sea coast in two ranges, the Hoosac and the Taghannac, the latter being the western and more elevated, culminating in Saddle Mountain, 4000 feet above the sea. More eastward still, irregular spurs form the principal ranges, diversify the country towards the coast, and give great variety and beauty to the scenery. The most marked elevations are Mounts Tom, Holyoake, and Wachusett, rising between 2000 and 3000 feet in elevation. The prolongations of these ranges to the sea coast, which to the south of Cape Cod trends

nearly east and west, have no great elevation; they may be separated into five, dividing the rivers which fall into Long Island Sound. The most important are Green Mountain, and Saghanic or Housatonic ranges.

It has been already noticed, that the mountains to the west of Lake Champlain attain an elevation of above 5000 feet; here the sources of the Hudson are 4747 feet above the sea; and Avalanche Lake, the most elevated of the lakes of eastern North America, is 3000 feet above the sea, while the River Au Sable descends 4600 feet in a course of forty miles to Lake Champlain. These mountains extend southwards, and are known as the Catskill as they approach the coast; their average elevation may then be 3000 feet, and they culminate on Mount Round Top at 3804 feet above the sea.

This district is noted for its magnificent waterfalls, of which those of the Au Sable River, the Trenton and Cohoes Falls of the Mohawk, and Glen Falls on the Hudson, are the best known, and probably the most remarkable; extending southward, these mountains form the Kattatinny range and Schooley's mountains, as well as the better known palisades of the Hudson, where the trap and greenstone rocks present their nearly perpendicular escarpments to the river, above which they rise from 200 to 500 feet; but unlike the more northern ranges, their summits form a table land sloping gradually to the west. The Kattatinny range extends southward in the North Mountains; this is the more eastern of the southern ranges, but rises irregularly, culminating 4000 feet above the sea, the more solid portion, which forms the watershed of the country, and known as the Appalachian chain, lying further west. In their greatest width these mountains are 150 miles; the western spur, which limits the basin of the Ohio, is known as the Chestnut ridge; the more remarkable are Sewell, Gauley and Flat Top Mountains; further south they become less defined and less elevated, Pilot Mountain, the highest summit, not exceeding 1765 feet, of which 214 are formed by a perpendicular pinnacle of rock. Still further south, detached mountains only are found, but some of these exceed 3000 feet in height, the main ranges trending to the south and west, and the peninsula of Florida not exceeding 150 feet in elevation at its highest point. The western ranges as they approach the Mississippi decrease in elevation, until the average does not exceed 1000 feet.

3 *Rivers of the North-East.*—Among these irregular and narrow ranges, numerous rivers have their rise, and flow eastward into the Atlantic. The more northern spurs form the valleys of the Ristigouch, Nipisquit, and Miramichi Rivers, having respectively courses of 1000, 80, and 150 miles; the latter is navigable for one-third of its length for large vessels. The rocky peninsula of Nova Scotia here forms the Bay of Fundy, into which the St. John, the most important river of the north-east seaboard, discharges its waters, draining an area of more than 20,000 square miles. The main source of this river is found near those of the Chaudière and Penobscot; in its upper course it receives the Allaguash from the right, and the St. Francis from the left, the former flowing through Windy Lake, which is 870 feet above the sea, the river having to its confluence a fall of 350 feet; and beyond these the Madawaska, which may be considered the secondary source of the river, flows through Lake Temiscouata, by which access is gained to the St. Lawrence, from which its sources are only distant twenty miles.

From the junction of the Madawaska the St. John has a southerly course, and forty miles below it is precipitated over the Grand Falls, which have a perpendicular height of forty feet, and with the rapids below give to the river a total declivity in this portion of its course of 120 feet. These falls are the limit of navigation, 200 miles from the sea, but ninety miles lower down, where the river has a still more southerly trending, there are rapids which impede navigation; between these the river receives two important affluents, the Tobique, from the left, which, rising among the highest elevations of the country, Blue, Ox, and Bald Mountains, which attain an elevation of about 4000 feet, flows through a most fertile and beautiful valley, between rocks of

gypsum, limestone, and sandstone; and the Aroostook from the right, a still more considerable stream, flowing nearly parallel to the main stream in its upper course. Below the rapids already noticed, a chain of lakes, occupying a fertile valley, send their surplus waters by a short canal to the main stream; and below this the river receives the Washedemoke, Belle Isle, and Kennebecasis, all of which expand into shallow lakes before joining the main stream. Besides these, it has a feature peculiar to itself, for near its mouth, after expanding to nearly a mile in width, it suddenly narrows, and rushes impetuously through deep channels, among rocks and islands of limestone covered with verdure; thus forming a shute or fall when the tide in the harbour is low, but the tidal wave generated in the Atlantic, and forced into the narrow channel of the Bay of Fundy, rises to from forty to eighty feet, and then at high water there is a similar fall up the river. The upper valley of the St. John may have an average elevation of 500 feet above the sea; it is a cold, damp, and dreary region, yet not altogether wanting in beauty or even sublimity. The middle course, comprising the valleys of the Tobique and Aroostook, is fertile and well wooded; the lower course, in the intervalles, extremely fertile; pine and spruce, with the hackmatack, alone flourish in the upper, the others abound with maple, beech, elm, oak, and walnut. The entire course of the St. John may be 450 miles; it is navigable for vessels of some burden ninety miles to the rapid already alluded to, and for steamers and barges to the Grand Falls.

The St. Croix rises on the reverse slopes of the watershed of the Aroostook; its sources are found in the waters of two chains of lakes, lying in basins of primitive rock; these are of irregular shape, and from thirty to fifty miles long. The streams which they discharge uniting, trend to the east, and after being broken by two considerable falls, form a broad estuary, which again opens into an extensive bay, known as Pasamaquoddy Bay, which also receives other small rivers.

Between the St. Croix and Cape Cod, the south-west extremity of the Bay of Fundy, some important rivers fall into the sea: the Penobscot, rising from several sources near those of the St. John, and Chaudière, which expand into numerous lakes, some of which are of considerable extent. Mount Katahdan is situated in the fork formed by the confluence of the eastern branch of this river; and below this, its principal affluent, the Matawamkeag, drains the country between the Aroostook and the Chiputneticook Lakes, the sources of the St. Croix River; its only other affluent of importance is the Piscataqua from the right; from this point the course of the Penobscot is nearly due south; its entire length exceeds 250 miles: it is navigable for large vessels for fifty miles, and falls into the extensive bay of the same name. The Kennebec has its principal source in Mooshead Lake, an irregular sheet of water, fifty miles in extreme length, and fifteen in breadth. The course of this river is more tortuous than that of the Penobscot, the country through which it flows is interspersed with lakes, but fertile: it is navigable for large vessels for twelve miles, and for small for thirty-five; its length exceeds 200 miles; it falls into Merrimecting Bay, as does the Androscogging, which, rising near Lake Megantic and the source of the Connecticut, collects the surplus waters of several lakes, and flowing south, is turned to the east by Mount Washington and the spurs of the White Mountains, and reaches the sea after a tortuous course of 150 miles. From the western spurs of the White Mountains, the Saco has a rapid fall into the bay of the same name, and is navigable for six miles from the sea; its entire length may be 160 miles. Below this is the Piscataqua, which has but a short course of fifty miles, but is noticeable as falling into Portland Harbour.

To the south of Cape Cod some small rivers are found to the east of the Connecticut, the Pawcatuc, and Providence, of which the Pawtucket is an affluent; these streams are rapid, and broken by falls, but the mouths are accessible to vessels of moderate size; the Merrimac, a more considerable river, rising from two principal sources, of which the Pennigewasset, the

northern, is the larger, and has its rise in the White Mountains: the Winnipiscogee flows through the lake of the same name, which is twenty-three miles long, by ten broad, and remarkable for the beauty of its scenery: it contains several islands, and is 470 feet above the sea; it is the largest of the lakes with which this district abounds; the united streams obtain the name of Merrimac 125 miles from the sea; the entire course of this river may exceed 200 miles, and it is navigable for about one-third of its length. The Connecticut has its sources, as already noted, near those of the Chaudière and Kennebec; its general course is south, and it has no affluents of importance, but its length is estimated at 450 miles, and it is navigable for fifty.

West of the Connecticut are the Housatonic and the Thames, both of which are navigable, the one for twelve, the other for sixteen miles; but the next important river is the Hudson, the most westerly of those which have a southerly trending: it rises, as already noted, in the mountain district to the west of Lake Champlain, has a course of above 250 miles, is navigable for large vessels 118, and for small 145 miles; its only affluents of note are the Sacondega and the Mohawk, already mentioned as having its source near Lake Ontario in Oneida Lake. A branch of this river is noted for its beautiful falls at Trenton, as the main stream is for Glen Falls, unrivalled for picturesque beauty. The Hudson is remarkable for the beauty of the scenery on its banks, and for the breadth and extent of its estuary. These rivers fall into Long Island Sound, and to the south and west are the Hackensac, the Passaic, the Rariton, and Little and Great Egg Harbour Rivers of inconsiderable length, but navigable for from ten to twenty miles from the sea. The Passaic is remarkable for its beautiful falls, seventy feet in height.

4 *Rivers of the South-East.*—To the south, Delaware River falls into the extensive bay of the same name. This river rises in the Catskill Mountains, is navigable for vessels for 125 miles from the ocean, and for small craft thirty miles further; its principal affluent is the Skuykil, which, rising in the Blue Mountains, has a course of 130 miles, and falls into the main stream about 120 miles from the mouth of the bay; it also receives the Lehigh or Leigh, which has a course of seventy-five miles, from the right, ninety miles above the limit of the ship navigation, and the Popacton from the left.

The Susquehanna rises in two principal sources, the one in Otsego or Oswego Lake, and the other in the westerly range between it and those of the Alleghany; its principal affluent, the Juniata, has a course of 180 miles from the west and south. In its course of 350 miles this river receives many small affluents, but is broken by short falls and rapids, and is only navigable at the mouth for small vessels; it falls into the head of the Bay of Chesapeake, and between this and the Potomac several smaller streams fall into the same bay, the chief of which is the Patuxent, which has a course of 110 miles, and is navigable for forty-six: the others are generally navigable for some considerable portion of their lower course. The Potomac rises from two sources near those of the Monangahela, and flowing first to the north, trends to the east and south-east, and after a very tortuous course of 400 miles, falls into the lower part of Chesapeake Bay: it is navigable for the largest vessels for more than 100 miles, but above that point is rapid and broken; the Great Falls are seventy-five feet in height; it issues from the Blue Mountains, 168 miles from its mouth; its principal affluent is the Shenandoah from the south, which has a course of 200 miles, and is navigable for half that distance. The Rappanahok, York, and James Rivers also fall into Chesapeake Bay; the former, rising in the Blue Mountains, has a south-easterly course of 160 miles, and its mouth is twenty miles south of the Potomac; it is navigable for small vessels for 105 miles. York River, formed by the confluence of two small rivers, is navigable for the largest ships for twelve miles, and forms an excellent harbour. James River is formed by the junction of the Jackson and Cowpasture Rivers; it has a course of 300 miles, and is navigable for 140; its principal affluent is the Appomatox, which flows into it about 100 miles from the sea; it has a

course of 120 miles from the south, and is navigable for twelve miles. To the south of Chesapeake Bay, Chowan and Roanoke Rivers fall into Albemarle Sound, which opens into Pamlico Sound, which again receives the river of the same name, and Neuse's River, forming an irregular and intricate navigation, indented with numerous creeks, some of which are connected by small streams with Lakes, as Lake Phelps, and Alligator Lake. To the north of Albemarle Sound is the Dismal Swamp, extending thirty miles, and covering 235 square miles; Lake Drummond occupies the centre, and the rest of the surface is thickly wooded.

The Chowan is formed by the confluence of the Nottoway and Moherrin, which have a course of more than 100 miles; the Blackwater is an affluent of the latter. The Roanoke also has two principal sources, the southern falling from the watershed of the Great Pedee, the northern from that of the Kenawha; the latter is known as the Staunton, and has a course of 180 miles to the point of confluence: the length of this river must exceed 300 miles, and it is navigable for large vessels to the Falls, seventy-five miles from its mouth. The Pamlico River, also called the Tar, has a course of 200 miles, and is navigable for thirty. The Neuse is about the same size.

Cape Fear River has a course of 300 miles, is navigable for ninety; in its upper course it is known as the How: its affluents are Deep River from the south, in its middle course, and south and north-east rivers from the north in its lower course. The Pedee, known in its upper course as the Yadkin, is a rapid and tortuous river, receiving many small affluents, of which none are important but Lynch's Creek and the Little Pedee, which join it from the south and north respectively, as it approaches the sea: it is navigable for more than 100 miles, and exceeds 400 miles in length. The Santee is formed by the confluence of the Wattarce and the Congaree, the former is also known as the Catawba; both have their sources in Blue Ridge: this river is navigable for small vessels for 100 miles to the confluence of its two sources, and forty miles further up both of them; its length may exceed 300 miles. The Savannah is formed by the confluence of two streams, the Keowee and the Tugaloo; its affluents are all from the right; of these, Broad and Ogeechee Rivers are the principal: it is navigable for ships for seventeen miles, and for small vessels for 400 miles to the mouth of Broad River; its entire course may be 500 miles. Eighteen miles south of the Savannah is the Ogeechee, which has a course of 200 miles. The Altamaha has two sources, and is navigable for small vessels for 300 miles: its total course may exceed 500 miles, and it enters the sea sixty miles south of the Savannah. The St. Illa and St. Mary's are about 100 miles long, and are navigable. Here are also extensive swamps, of which that of Okfenoko is the most remarkable; it is 180 miles in circumference, and in wet seasons becomes a lake. The St. John River rises in an extensive cypress swamp, and flowing northward, expands into numerous lakes, of which Lake George is the most extensive, being twenty miles long and twelve broad: its principal affluent is the Oklawaha from the left, and it receives the waters of Lake Orange, those of Dunn's Lake also join the main stream from the right. Lake George is 107 miles from the sea, and to this point the river is navigable.

The Peninsula of Florida abounds with lakes and lagoons, the former remarkable for their depth; the largest of these is Lake Okeechobee or Macaco; this is nearly circular, and may have a diameter of more than thirty miles. It receives the surplus waters of Tobopkalega, Cypress, and Istopoga Lakes from the north by Kissinec River.

5 *The Vegetation of North America.*—The natural divisions of North America have already appeared, but with respect to their vegetable productions they require further subdivision, consequent on latitude, position, and exposure, or it may perhaps be more convenient to make a fresh division for this purpose, which may be thus stated—

The districts of the Northern Lakes, the Great Lakes, and St. Lawrence, the North-east Littoral, the South Littoral, the Mountains of the East, the Missis-

issippi proper, the Ohio and its affluents, the Missouri and its affluents, the Great Salt Basin, the rivers of the South-west, the rivers of the West, the Southern extension of primary watershed, the Northern extension of primary watershed.

The district of the Northern Lakes is that least important in this particular. To the south, the watercourses are in most parts bordered by swamps and well-wooded alluvial tracts; the principal trees being the spruce, white cedar, white beech, and willows; these become less frequent as the latitude increases, stunted willows, and birches, and the luxuriant grasses, give place to mosses and lichens; along the course of the Mackenzie, however, vegetation extends to the sea, the white spruce covering a large portion of its delta, and attaining to nearly  $70^{\circ}$  of north latitude. To the east the barren grounds afford a more sparse vegetation of the same character, but on the islands to the north, especially on Melville Island, both the character and the development of the vegetation improve greatly, and fit it for the support of animal life. The temperature of this region does not differ very materially, the greater portion being within the limit of perpetual ground frost, yet enjoying a warm, though short, summer, in which the heat approaches  $100^{\circ}$ .

The district of the Great Lakes and St. Lawrence is intermediate between this, the basins of the Mississippi and Ohio, and the North-east Littoral; its vegetation depends on soil and climate, the latter on exposure and longitude. The cincture of rocky hills to the north, so close to the lakes, gives a favourable exposure to a large portion of the country; the vicinity of waters to the whole, especially to the great Peninsula of Western Canada, between Lakes Huron and Erie, modifies the temperature, which is further improved by the quality of the soil; limestone and sandstone predominating from the shores of Lake Superior to the Ottawa River. Here, in addition to the trees above-mentioned, the vast forests of pine have been a source of national wealth, while on the richer soils hardwoods of all descriptions,—walnut, beech, oak, birch, and maple of all kinds, are found in great abundance, and of magnificent growth; the sugar-maple produces an article not only of domestic use, but foreign export; rice grows on the margin of the smaller lakes; and wild fruits,—grapes, raspberries, strawberries, cranberries, &c., abound, the latter covering extensive swampy grounds in cold situations on poor soil, and the former springing up among rocks, while the strawberry, as in England, delights in the grassy sward of the fertile upland. So constant is the vegetable product to the quality of the soil, that the one known, the other may be predicated with much certainty; on the shores of Lake Erie, the successive terraces or raised beaches which have been formerly borders of the lake, are apparent at a distance from the difference of their vegetation. Varying in latitude from  $41\frac{1}{2}$  to  $50^{\circ}$  north, and extending to  $93^{\circ}$  west longitude, the temperature increasing with the westerly as well as the southerly increase of distance, although throughout experiencing extremes both of heat and cold, this district differs considerably in temperature in different parts, the most temperate portions being, of course, those in most immediate proximity to water; the varieties of its vegetation are best seen in those of the surrounding districts.

The North-east Littoral consists first of the valleys of the rivers north of Cape Cod, and second of those between that Cape and Cape Hatteras; of the first the prevailing trees are coniferæ, which grow in the greatest luxuriance over the higher ground as well as on the sandy soil near the coast. Nevertheless, in the wide intervals along the course of the rivers, and on the margin of the lakes, hardwood is not wanting, but generally confined to the middle and lower courses, the upper as well as the high lands being occupied, wherever the axe of the lumberer has spared them, by pine, spruce, hemlock, larch, cedar, the dark foliage and irregular outline of which form a regular and constant background to the picture, both in winter and summer. The change between the divisions of this district is marked by the valley of the Hudson, yet here the pines still occupy every elevated position, while to the south the

magnolia and similar evergreens take the place of the deciduous trees, which again displace the evergreen conifers on the hills, the tops of which are frequently covered with greensward.

The Southern Littoral has these characteristics, but exposes great tracts of pine barrens and cypress swamps, and is suitable for the cultivation of cotton, tobacco, and even sugar; maize is the local cereal. It is on the islands of the southern Littoral that the finest cotton is cultivated, but in the lower portion, within the line of coast, a district of barren sand is found from twenty to forty miles wide; from it a terrace of remarkable fertility rises to the west, abounding with the finest hardwood timber, especially hickory, walnut, and mulberry. In the marshy districts of the south rice is extensively cultivated, and has become the most important article of export next to cotton.

The peninsula of Florida, as its name implies, is very rich in vegetable productions; its swamps abound in cypress and aquatic plants, some of which are peculiar to the locality. The rising grounds are covered with oak and other deciduous trees; the magnolia grows luxuriantly, and the southern portion, having a rocky soil, presents mastic, *lignum vitæ*, wild fig, palmetto, and mangroves. The eastern portion of Florida is less favourable for vegetation than the western, where the soil is calcareous, and the exposure more genial; there the orange, sugar-cane, cochineal, cactus, and coffee tree are naturalized; and cotton, sugar, rice, indigo, and maize, are the staple products of cultivation. Pine barrens and cypress swamps cover a large proportion of the surface between Florida and the Mississippi, to the west of which river a saline tract extends, destitute of other vegetation than coarse grass and reeds, beyond which are again found cypress swamps, adapted for the cultivation of rice, and comparatively poor tracts covered with pine trees.

The mountain district of the east requires little description, being indeed but the division between the districts of the coast and the interior, and partaking of the character of both. As already noticed, the rugged mountain peaks of the north are clothed with a magnificent growth of pine and spruce, while in the valleys alone the deciduous trees are found; to the south these last prevail and are accompanied by vegetation of a semi-tropical character, as indicated by such names as chesnut ridge, laurel ridge, &c. Here *sarsaparilla*, ginseng, and other useful plants abound.

The district of the Mississippi Proper has already been described as intermediate between the prairies, the wooded region, and the region of primitive rocks, and the vegetation is correspondent to each. The balsam poplar, aspen, and ash, are here characteristic trees, and these, with pine, spruce, hazel, arbor vitæ, and occasionally sugar maple, and elm, extend to the Saskatchewan, which is their northern limit; on the other hand forests of pine, larch, and birch, extend to the eastward, while the valleys of the rivers and shores of the lakes between Lake Winnipeg and Lake Superior assimilate in character to those of the north-eastern affluents of the Mississippi. The district of the Ohio and its affluents is essentially one of deciduous forests, neither so wet nor so cold as the more northern, with a soil of great fertility; its forest vegetation is of the most luxuriant as well as the choicest kind, the upper waters of the river, flowing in rocky channels, present little if any alluvial soil, and yet are overhung by verdant forests. Even the barrens, so called, are so indeed only by comparison, and few portions of the earth's surface are more generally fertile and available for industrial occupation. To the west open glades begin to expand, dotted park-like with clumps of trees, to spread still wider into prairies; these again are bordered, near the rivers, by wide tracts of the richest alluvial soil; the vine here also grows in great luxuriance. The climate of this district is, however, colder on the whole than that of the Littoral.

The district of the Missouri is one of prairies which extend on both sides of that river and the country drained by its affluents, as well as on the lower course of the so-called Mississippi; these prairies are limited as already noticed, on the west by the 105th meridian, and on the south by the Ozark



Mountains; on the north they extend, with more or less integrity, to the lower course of the Mackenzie, varied only by occasional patches of willow or cotton wood on the banks of the rivers, which, however, usually flowing in deep channels, have but little effect on the neighbouring vegetation. The accumulation of water in the lower course of the Mississippi, with the mass brought down by its great affluent rivers, causes extensive inundations, covering an area of 25,000 square miles, the greater part of which is never sufficiently drained for cultivation: here extensive cypress swamps are found.

The south extension of the primary watershed presents a greater proportion of barren surface than any portion of the continent save the north-east; yet even here, the climate, favourable to vegetation, produces, wherever sufficient earth is to be found, a heavy and semi-tropical growth of plants, and assimilates closely to that of Mexico, with which it will be naturally described. The eastern spurs from the main chain have much similarity to the more favoured portions of the Appalachian chain, presenting in elevation at a low latitude the same features here which a more northern latitude affords there. To the east the pine tree grows to a great altitude, not unfrequently exceeding 10,000 feet, while the mountain valleys are rich with vegetation similar to that of the lower course of the Atlantic rivers. The difference between the ranges of primitive rock and limestone in this respect has been already noticed, as has the sterile strip at the base of the mountains, with its vegetation of cacti and artemisia. The northern extension of the primary watershed gradually loses the presence of the deciduous trees, until the pine stands out in bold relief from the background of the eternal glacier, or rises in giant grandeur from snow still compact in July. The western slope of these mountains is more abundantly wooded than the eastern; the deciduous trees forming the characteristic feature round the grassy lakes of the Columbia, while the spruce and cedar border those of Frazer's River and the Okanagan, and extend to the rocky margin of the northern sea coast, being abundant even as far north as Cook's Inlet. Deciduous hardwoods are, however, found not only on the Columbia, but on the lower course of Frazer's River, Simpson's, and Salmon Rivers.

The most marked feature of this mountain range is the great salt basin, approached as it is on the east by the plains of the southern branch of the Columbia, covered with artemisia. Here the bottoms of the rivers and margins of the lakes alone are fertile; but few trees are found, and those small, principally willow and cotton-wood, while saliferous plants prevail. The mountains which surround it, however, have forests of pine and spruce, and on the western slope of its cincture, the Sierra Nevada, the luxuriant woods of California rival those of Ohio in beauty, and exceed them in variety and development of the species which they contain; while to the north, in the lower valley of the Columbia, the increased humidity of the atmosphere favours a vegetation of extraordinary and almost fabulous magnitude, especially of the coniferæ; these are, however, in consequence of their more rapid growth, less valuable for useful purposes, and the best timber is found above the 50th parallel in Vancouver's Island and still further north.

## CHAPTER XXXI.

## MEXICO AND CENTRAL AMERICA.

§ 1. Sources of our knowledge of the interior.—2. More recent information.—3. Boundaries and limits.—4. The watersheds.—5. The rivers and lakes.—6. Natural productions.

**SOURCES** of our knowledge of the Interior.—We owe our knowledge, such as it is, of the interior, both of Mexico and of the Isthmus, to the Spaniards. Cortez not only crossed to, but penetrated along the western coast as far as the Huasculualco, and returned to the Caribbean Sea. Vasco Nunez de Balboa had, however, been the first to cross the narrow portion. This was in 1513, and in 1572 Drake saw both oceans at one view; after him the Buccaneers crossed frequently. The Spanish conquerors had three regular tracks besides those discovered in the search for gold; but of the information obtained by the Spaniards we know little, from the jealous policy of the Spanish court. The pearl fisheries in the Pacific were the means of maintaining a path across the eastern portion; transit was also kept up by the San Juan and Lake Nicaragua; and the civilization and riches of Mexico stimulated to exploration and conquest on the north-west. Alvarez had penetrated to the south and east, along the coast, for 400 miles, and Nunez de Guzman far to the north; but the promontorial extension of Honduras and Yucatan remained unexplored. In more recent times we are indebted to Humboldt for our knowledge of Mexico; and in the endeavour to secure easy transit from sea to sea, the emissaries and surveyors of Spain, England, France, and the United States have explored the isthmus in almost every direction. Of these, Garay surveyed the course of the Huasculualco to connect the Gulf of Honduras with the Pacific; Oersted, Squier, and Baily have been employed on the district of Nicaragua; Lloyd, Falmere, Morel, Garilla, and Hughes, between Chagres and Panama; Wood on the Cupica, Greiff on the Atrato; and the reports of Cullen and Gisborne on the Savannah and Chuquanaqui have led to the surveys of the officers of the French, United States, and English navies, which have resulted in our more satisfactory knowledge of the valleys of the rivers falling into the Gulf of San Miguel.

2 *More Recent Information.*—The surveys conducted under Captain Prevost, conjointly with officers of the United States navy, have removed all doubt, if reasonable doubt existed, of the considerable elevation of the watershed of the Isthmus of Darien, and its proximity to the northern coast. The activity of the citizens of the United States, who are now apparently taking possession of these regions, will soon add to our at present but small stock of information concerning them.

3 *Boundaries and Limits.*—The northern limit of Mexico is indefinable, either politically or geographically; in the latter view it should at the least extend to the apex of the triangle formed by the Colorado and Rio del Norte; this, however, can scarcely now be expected. If Central America be considered—as is most usual—to extend from the narrow neck which joins the plateau of Mexico to the mountains of Honduras, to the still narrower isthmus by which the southern portion of the western continent is attached to it, it may be represented as formed of two triangles; its greatest length may be 950 miles, and its greatest breadth 400; and its area may be estimated at 50,000 square miles; its eastern extremity may be 120 miles wide; its western has the greatest extent, already given; the breadth of the smaller triangle may be 384 miles, while across the triangles, 150 and 120 miles may be estimated respectively.

4 *The Watersheds.*—The watersheds of the southern extension of the Rocky Mountain range form an elevated plateau, more remarkable in many respects than any other of which we have knowledge. The Sierra Madre, already noted as the continuation of the main range from the north, now approaches the western coast, trending south-east as far as the Isthmus of

Tehuantepec, where a depression is found, beyond which the mountain ranges become less connected and less regular; as to the north the Sierra de los Mimbres and the lower chains to the east enclose the upper valleys of the Rio Grande del Norte, so to the south the Sierra Madre and the Cordillera Colahuela, or Potosi, enclose mountain valleys divided from that of the Rio Grande and from each of them by transverse chains, by which all outlet for their waters is prevented, and by which the Laguna del Cayman and other lakes are formed. These valleys extend about 450 miles from north to south, with a breadth of 150; their average elevation may approach 6000 feet: to the south a mountain knot, indicated by the Cerro de Potosi, rising more than 16,000 feet above the sea, separates these valleys from those of the River Panuco and Rio Grande del Lerma, to the south of which plateaux or mountain valleys of smaller dimensions but as great elevation are again found; of these that of Tenochtitlan or Mexico is the most remarkable; it is 7470 feet above the sea, about fifty-five miles long by thirty-seven broad, and surrounded by porphyritic ridges; above and around these valleys tower some of the most elevated peaks of these ranges: Popocatepetl, Orizaba, and Iztacihuatl are volcanoes in recent action, and respectively 17,716, 17,380, and 15,700 feet above the sea. Here the mountains approach nearer to the eastern coast, and a table land extends on their western slope for 400 miles, supported by lower ranges near the western coast, from which rise the volcanoes of Colima and Jorullo, the former 12,000, and the latter not much more than 4000 feet above the sea. There are many other extinct cones. To the south and west of the Plain of Mexico the descent to the coast is by parallel valleys, rising respectively 500, 1700, and 3300 feet above the sea, and here the mountain ranges become irregular and confused; on the east the table land approaches closely to the coast, sinking rapidly down from an elevation of 3000 feet to the level of the plain which skirts the shore; here the Sierra de St. Martin stretches toward the Isthmus of Tehuantepec, terminating towards the east in the volcano of Tuxtla. The northern of these ranges, especially the Sierra Madre and Cordillera of Potosi, are remarkable for the abundance of the mineral deposits, and contain some of the richest silver mines in the world; the porphyritic and amygdaloid rocks, with greenstone and basalt, occupying a large portion of the surface of the country. The line of perpetual congelation is here about 15,000 feet, and consequently only four of the most elevated summits are covered with perennial snows.

The watersheds of Central America may be briefly described as consisting of one principal, running throughout the entire length, connecting the Mexican plateau with the mountain ranges of South America, and having its short slope to the Pacific, while to the north, transverse ranges stretch towards the Gulf of Mexico, enclosing valleys, narrow, but fertile, seldom extending into plains, except near the centre, where the mountains rise in isolated cones, and at the extreme north, where the mountains disappear as the coast is approached. The whole surface is however very irregular and varied. If the mean altitude be taken at 7000 feet, it will probably be in excess, yet the loftiest summits attain to 14,000 feet above the sea. The entire range gives evidence of volcanic action, both ancient and recent, and many of the mountains have been raised by volcanic energy, if not within the memory of man, within the traditionary recollection of two generations; it is indeed one of the remarkable centres of such forces, and second only perhaps to that of the Indian Archipelago. The active volcanoes are all situated near the main axis of elevation.

To the west, the more remarkable elevations are those of De Agua, Del Fuego, and Atitlan; the former rises in regular conical form 13,578 feet above the sea; its crater, the fires long since extinct, measures 300 feet in diameter; the second, as its name implies, is still active, but does not attain to so great an elevation, nor indeed do those to the eastward. The most remarkable volcano is that of Yzalco, which has been in continuous action since its elevation, probably about the year 1750; it does not exceed 1600 feet in height. San Salvador mountain does not attain to a greater elevation

than 8000 feet, but is very rugged, and separated from the main chain by a precipitous ravine; San Vicente rises to about the same height, but San Miguel does not much exceed 5000.

Farther eastward, within the second triangle, the main range divides, forming the basin of Lake Nicaragua; the coast range is here of but little elevation: to the south, volcanic cones stand isolated from the principal mass; of these, Momotomba, at the northern extremity of Lake Nicaragua, may have the greatest elevation, attaining probably to 5500 feet; the more important of the others are El Viejo, Telica, Nindirí, Mombaco, and Omotepe on an island in Lake Nicaragua. To the east of these, the elevations become greater; the mountain of Cartajo, rising 11,500 feet above the sea, that of Votos 9840, and Orosi 5200: the former has a crater, the fires of which are now extinct, extending for more than a mile in circumference.

At the eastern extremity of Central America, the order of the slopes of the main watershed is reversed, the shorter being to the north, and the longer to the south; the mean height does not probably exceed 5000 feet, and there are not many elevated summits, although the height increases as the southern division of the continent is approached.

5 *The Rivers and Lakes.*—These are numerous, but not important. Of the rivers of the north the most considerable is the Rio Grande del Lerma, or Santiago, which has its rise from two sources: one, which is the larger, in the western slopes of the plateau of Mexico; the other in the little Lake Lerma, at the base of the volcano of Toluca: its upper course is through the mountain valley of Toluca, 8570 feet above the sea, its middle through the fertile valley of Baxio, in the plain of Queritario, extending from the south of the Sierra Madre, 6500 feet above the sea; here its direction is north-west, and its waters deep and still, but from thence turning westward it descends into the plain of Xalisco, which extends almost to the shores of the Pacific, and has not a greater elevation than 4000 feet; the river has a rapid course to Lake Chapala, where its two sources unite; it is of irregular form, and may have a greater length of seventy-five miles by fifteen in breadth, with an area of 1300 square miles. From this lake the course of the river is broken by, it is said, sixty falls in about three miles, below which it is still rapid and irregular: it has a broad estuary, containing several islands; it has two considerable affluents from the right,—one in its upper and one in its lower course; its entire length may be nearly 500 miles, but few portions of which are navigable. Not dissimilar in character, though more navigable, is the Panuco, which descends from the opposite side of the table land of Mexico to the Gulf, the source of the two rivers being not far distant from each other. Its upper course is rapid and broken, and receives the surplus waters of Lake Zumpango: here it is known as the Moctezuma; it becomes navigable for boats 170 miles from its mouth, and in its lower course receives the Tamoin from the west, below the conflux of which it obtains the name Panuco; eighty miles from its mouth it is navigable for vessels of considerable size; its mouth is obstructed by a bar; its entire course exceeds 400 miles. The plain through which the lower course of the Panuco reaches the sea is, for a breadth of ten miles, nearly level, and skirted by dunes and shifting sands, arid and barren, and interspersed with swamps; the interior is, however, undulating and fertile: to the north the coast is covered by low islands forming lagunes, some of which have been shut off from the sea; of these the most considerable is that of Tamiagua. The Santander and Alvarado, considerable rivers, and some others of less note, also fall from the eastern slope into the Gulf of Mexico. Those to the south are for the most part scarce worthy the name; to the west, the principal is the Motagua; its course south-east, east, and north-east, for about 200 miles; to this the River Tinto is confluent at the mouth; its affluents are the Piscaya, Sacatepiques, Platanos, and Chiquimila, on the right; those of the left are unimportant: it has the character of a mountain torrent in the upper course, bringing down in the rainy season a considerable body of water. The eastern coast has several large rivers—of these the Belize has a course of about 200 miles, the Sibun of probably 150, the

Nuskioi and Hondo of about 100 : the two latter, with the San Josef, flow into an extensive estuary, sixty miles long by ten broad, and communicating with the navigation in thick reefs, which cover the eastern shore of Yucatan for 130 miles, at a distance of from four to eight miles. The rivers of this country are subject to violent floods, not only from the rain, which frequently falls in excessive quantities, but also, it may be believed, from the elevation of their sources. The interior of the country must be lofty, since there are mountains within sight of the shore, which exceed 5000 feet in height. The coast is, however, low, and intersected with lakes and lagunes. The Polachic has a very irregular tortuous course of about 150 miles to the Gulf of Dulce. The Lacantun has a course of 400 miles, receives La Passion, and Usumasinta, both considerable streams, and falls into Lake Terminos. The former rises among the mountains of Chamma, in Lake Lacandon; it has two important affluents, the Santa Isabel and Mataquece. This river brings down with its waters an immense quantity of mud and *débris*, and has with its confluent streams formed an extensive delta at their mouth, extending westward from Lake Terminos.

The Gulf of Dulce is a remarkable feature in this part of the country; it is thirty miles long by ten broad, and communicates with the seas by the smaller lake, called Golfete, and the River Dulce, which, together, may be twenty-five miles in length; a bar at the mouth of the river impedes its navigation. Several lakes are also found here; Lake Peten may be thirty miles long by ten broad; Lake Atitlan fifteen by eight,—this lake receives several streams, but has no visible outlet; Lake Amatitan is small, but communicates with the Pacific by the River Michatoyat.

Eastward, the Lempa flows for above 100 miles, bearing the surplus waters of Lake Guija, which may be fifteen miles long by five broad, to the sea; it receives several affluent streams. The Paza, falling into the Pacific, may also be noticed. The Camulicon, Ulua, and Aguan fall into the Caribbean Sea: of these, the Ulua is the most important; it is formed by the conflux of the Venta and Sulaco, as the former of these is by the Santa Jago and Santa Barbara, receives several affluent streams, of which the more considerable are the Blanco, from the left, flowing through Lake Vojoa, which may be twenty miles long, and the Cullampa from the right, watering the great plain of Sula on the coast, and has a course of above 300 miles. The Aguan, also called the Roman, may have a course of 100 miles; it has two principal mouths. The Tinto and Wanks are also considerable streams. These rivers flow through thickly wooded districts, and are but little known.

The most important river of Central America is, however, the San Juan, by which the surplus waters of Lake Nicaragua are carried to the Caribbean Sea. The lake, which is ninety miles long by thirty broad, is ninety feet deep, and 125 feet only above the sea, and receives the surplus waters of Lake Managua from the west by the River Tipitapa or Panaloya, the course of which is broken by a fall of thirteen feet; it is 100 yards wide, and in its lower course flows slowly through a nearly level channel; this lake is thirty-eight miles long, and twenty-eight feet above that of Nicaragua. The River Tipitapa is sixteen miles, and the St. Juan 110 in length; the latter is rapid, and in many places shallow, but has been made practicable for small steamers; it enters the sea by several mouths. On Lake Nicaragua are several islands, the most important of which is Ometepe, consisting of two granite cones, the eastern of which, Las Maderas, is an active volcano. This island exceeds 5000 feet in elevation, is twenty-seven miles long and nine broad, but in the centre is only an isthmus six miles long and one mile broad. The plain of Leon extends to the south and west of the lakes, but a chain of mountains, not indeed of considerable elevation, but presenting elevated peaks, separates it from the Pacific. A more massy and important range passes along the north shore of the lake, and stretches its spurs into the territory of Mosquitia to the north. Eastward of the St. Juan no river of importance is found, until the Savannah and the Chuquanaqui unite to form Savannah Harbour at the head of the Gulf of Darien or San Miguel. These are considerable streams, especially

the former, which, rising to the north of the Tichique range, bends round its eastern extremity, and becomes confluent with the Tuyra, which rises from the western slope of the watershed of the Atrato, the Cordillera Chacargun forming the Rio Grande or Santa Maria. The Atrato, or great river of Darien, flows from the south into the Gulf of Darien, has a course of 200 miles, and is navigable for about 150. The recent survey of this portion of the isthmus shows the country to be rock of considerable elevation, in the interior deeply intersected by the watercourses, and covered with the most luxuriant vegetation. The lower course of the rivers is through the richest alluvion; they are navigable for some distance, but choked with mangroves; indeed, the vegetation of this country is rich both in number of species and development.

6 *The Natural Productions.*—The geological formation of the mountains of Mexico has been already noticed, and is familiar to most from the descriptions of Humboldt; its mineral wealth has obscured the botanical productiveness of the country, the great variety of its climate and soil making it suitable to the vegetable life of both temperate and tropical climates, varying from the cold arid plateau of the Cordilleras to the low moist valleys of the Isthmus of Tehuantepec, and from the bare walls of irruptive rock to its dense forests; but 3000 mines offer temptations too potent for human reason to resist. The country is comparatively uncultivated, its natural productions neglected, and to the north cattle form the staple produce, and from the upper valleys of the Rio Grande no doubt the horses have descended which are now the principal wealth of the natives of the prairies of the Missouri and the upper valleys of the Columbia. The geological formation of Central America may be briefly stated as consisting of immense parallel bands of auriferous granites, gneiss, porphyries, chlorites, slates, hornblendes, and quartz rocks, intersected transversely by deep ravines. Sandstones are present in Nicaragua; coal is said to be found in Veraguay and Chiriqui, especially in the island of Muerto; auriferous deposits abound, as suggested by the local appellation Costa Rica, and there can be no doubt that the mineral wealth of the country is very considerable. At present, however, this yields to the more apparent luxuriance of the vegetable productions, especially of the eastern extremity, which are scarcely to be exceeded anywhere, the general fertility of the soil and the variety of climate making it suitable for the production, not of tropical plants only, but those of temperate climes; indeed, the extended plains and oak forests of Darien have great similarity to those of Northern America. Indigo, tobacco, cocoa, vanilla, sarsaparilla, cotton, sugar, gums, spices, balsams, and dye-woods abound; nor is mahogany the only valuable wood, for besides teak, mora, rosewood, ebony, satin-wood, lignum vitae, and lance-wood, the hills produce oak, ash, beech, cedar, fir, larch, and other well-known European trees; and the bamboo and mangroves form numerous thickets in the low lands. Central America then not only unites the northern to the southern division of the western continent, but is in production as in situation intermediate between them.

## CHAPTER XXXII.

### OF SOUTH AMERICA.

§ 1. Historical sources of our knowledge of the interior.—2. More recent information.—3. Of the boundaries and limits.—4. Of the coast line.—5. Of the watersheds.—6. Of orographical classification.—7. Classification of rivers.—8. Geological formation.

**H**ISTORICAL Sources of our knowledge of the Interior.—The Conquest of Peru and the western coast of South America are topics which belong to History. It may here be sufficient to say that, as in Mexico, the state of

civilization in which these countries were found made discovery for the most part unnecessary or undesirable; so that the knowledge of the interior acquired by their conquerors has, even to this day, amounted to little more than what was transferred to them from those whom they conquered.

In the endeavour to extend their conquests south from their settlements at Panama, the unhealthy climate and luxuriant vegetation of 'Terra Firma' constantly baffled them; and it was from the sea that Peru was invaded, in 1531. The next year Almagro invaded Chili, and at his death in 1537, Pedro de Valdivia penetrated to the fortieth degree of south latitude: in 1533, Sebastian Belnacazar subdued the province of Quito; and Alvarado, who had been trained in the wars of Cortez, ascended by the river of Guayaquil to the plateaux of the mountains. In 1540, Gonzalez Pizarro marched from Quito eastward in quest of the country where the natives stated that cinnamon was to be found in abundance, and which was in consequence named *Los Canelos*, a name which it has retained to the present day; after crossing the mountains, with much suffering, from earthquakes, storms, and cold, Pizarro reached the Province of *Zumaco*, and found the plant for which it was so famous (which however proved not to be the cinnamon of commerce); from thence he pushed eastward into the valley of the *Napo*, and constructing a boat, sent Francisco de Orellana with forty men forward to collect provisions, who, on reaching the confluence of that river with the main stream, finding it scarcely possible to support life in his own party, or to return to Pizarro; tempted also, no doubt, by the hope of making the discovery of the course of what promised, what it has since proved, to be the largest river on the surface of the earth, commenced his downward voyage on the 31st December, 1540, and after great hardships reached the sea in August, 1541. In Spain, the account of his discoveries easily procured for Orellana a grant of extensive territory, which in 1549 he returned to colonize, but perished from the diseases incidental to the climate, and the attempt to colonize in that country was abandoned. The river which he descended has by some been called by his name; the name *Amazon* was conferred on it, in consequence of one of the fables he related; that of *Maranon* was however earlier applied to its lower course by the followers of Columbus, and, as in the case of the *La Plata*, and indeed of the entire continent, the name which was least applicable has been most commonly retained.

Pizarro returned with difficulty to Peru, when, on reaching the mouth of the *Napo*, he found no traces of Orellana, but subsequently, in 1560, Pedro de Orsua explored the *Juati* and *Jurua*, affluents from the right; in 1615 the governor of *Maranhã*, *Alexandro de Moura*, sent Francisco Caldeira up the *Tocantins*, who formed a settlement where the tower of *Para* now stands; and in 1648 some Portuguese discovered the *Rio Negro*, and crossed the *Andes* to *Quito*.

It has been already related that Sebastian Cabot discovered the river *La Plata*, and even ascended the *Parana* to beyond the twenty-seventh degree of south latitude; but Pedro de Mendoza having obtained a grant of the country, founded the city of *Buenos Ayres*, in 1535, from whence he despatched *Juan de Ayolas* to select a favourable site for another city higher up the river. Having ascended the stream for more than 1000 miles, and passed the twentieth degree of south latitude, he struck off to the west, and penetrated to the borders of Peru, from whence returning he was massacred by the natives. *Domingo Martinez de Yrala*, who had been left by *Ayolas* to wait for him, having given him up for lost at the end of the time fixed for his return, now followed in the steps of his late commander, and in 1549 ascended the *Paraguay* to the seventeenth degree of south latitude, and crossed the mountains to the head waters of the *Guapay*. *Falkner*, a naval surgeon, who had become a Jesuit missionary, visited and resided in the southern extremity of the continent.

But little further information respecting the interior of South America is obtainable, until the disputes between Spain and Portugal as to the southern limits of Brazil induced the former to send *Felix de Azara* to survey the country about the boundary in the year 1781; and in 1778 the same enter-

prising officer examined the coast south of the La Plata; and subsequently, in 1799, Alexander von Humboldt, and his friend de Bompland, landed at Cumana, and crossed the Cordilleras, to the llanos, embarked on the Apure, and descended this river of crocodiles to the Orinoco; having reached the mouth of the Temi, they ascended that stream, and having dragged their canoes across a short portage to an affluent of the Rio Negro, and surveyed the remarkable canal, called the Cassiquaire, which unites that river and by it the Marañon to the Orinoco, they returned by that channel, having performed a canal voyage of more than 1500 miles, on the waters which flow among the primeval forests of the south, and reaching Cumana safely, passed thence to Cuba.

In 1801, Humboldt, having agreed to meet Capt. Baudin, then on a voyage of exploration to the Pacific, landing at Carthagena, passed to Santa Fé de Bogota: and having crossed the Andes by the pass of Quindiu at an elevation of 12,000 feet, and traversed the Cordilleras of Almáguera and tableland of Los Pastos, reached Quito, after a journey of four months' duration: and in 1802, in conjunction with Bompland and the Marquis de Selvaegre, he visited the most remarkable of the volcanic cones of the Andes of Peru; afterwards crossing the Andes, he descended the Chamaya to its junction with the Marañon, and returning across the Andes visited Caxamarca and Truxillo, and from thence crossed the desert country to the coast at Lima; from Guayaquil he sailed to Acapulco; arrived in New Spain, he devoted himself to inquiries into its history, geography, and natural productions, visited the volcanoes of Jorullo, Popocatepetl, and Itzacuhuatl, and the peak of Orizana, and then sailing from Vera Cruz, returned to Europe by the United States.

When the rapacity of the Spaniards had exhausted the supply of labourers in the mines, and the morbid avidity with which the treasures of South America had been sought by them had subsided into the indolence and sensuality natural to a dominant race in such a fertile country and salubrious climate, English capital and energy were soon engaged in reopening and working the mines which had been deserted by them, or which they found themselves incapable of working: and much of our knowledge of the interior of South America is derived from the journeys of those employed in this work. Of these, the first and most remarkable was Captain, now Sir Edmund Head; he crossed the Pampas, or great plains which extend eastward of the La Plata for 900 miles, and visited the gold mines of St. Louis, and the silver mines of Uspallata.

In 1826, French visited the provinces of La Rioja and Cordova, 172 leagues from Buenos Ayres; and in the same year Soria explored the Vermeyo, an affluent of the Paraguay; in 1821, Lieutenant Hibbert had crossed the Pampas from Cordova to San Juan at the foot of the Andes; and from these and other sources, a general knowledge of this country was obtained, but doubtless much might yet be communicated, especially by those who have traversed it for botanical purposes.

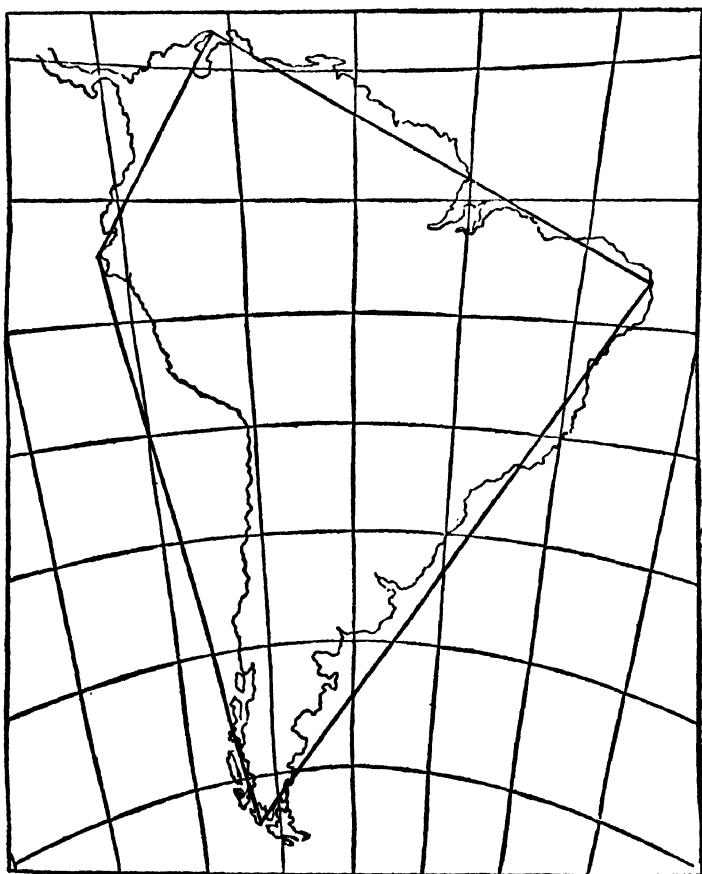
In 1836, Gosselman, a Swede, journeyed from Cordova to Mendoza, and the same year explored the gold and diamond districts in the interior of Brazil, through the northern provinces of which Koster had also travelled; while at the same time Schomburgk was exploring the Essequibo and its affluents, the Cuyunuy and Rupunoony; and subsequently McCann galloped, like Head, through the Argentine provinces.

2 *More recent Information.*—The rapidity with which our knowledge of the interior of South America is increasing is not a little remarkable, and the last half of the present century will probably see it fully developed.

But in no part of South America has this increase of knowledge been so remarkable as in its most important part, the great valley of the Marañon. Condamine had descended that river in 1745, Lieutenant Smyth in 1835, and Castelnau in 1843: and these voyages and that of Edwards up the river, had attracted attention to it, which was increased by the exertions of Lieutenant



Maury, of the United States Navy: the indefatigable Lloyd had also his attention directed the same way, indeed it may be said that generally the eyes of Europe were attracted to it. Lloyd himself having visited the mining district of Copiapo in 1852, crossed the Andes to the valley of the Chimose, an affluent of the Marañon, but was turned back by the impenetrable character of the forests, and the unhealthiness of the climate. Lieutenants Herndon and Gibbon, in the employ of the United States Government, were sent to explore the Huallaga and Madera; and Mr. Markham visited, the sources of the Purus; and the characters of the rivers of the south became better known; while on the north, Wallace explored the Rio Negro during the years 1850, 51, and 52, and the Napo and Coca were examined by Yturburu: and thus opened, the navigation of the Queen of Rivers has commenced, and a steam voyage up the Marañon will soon be as readily effected as one up the Mississippi. Further information may also be expected; the State of Ecuador, as well as the Empire of Brazil, is fully awake to the value of her portion of the Great Valley; Deville has been sent from Paraguay to trace the course of the Madera to the main stream, and the labours of Bonpland and Weddell, released from the ignorant tyranny of Francia, give promise of an abundant harvest.



3 *Of the Boundaries and Limits.*—These are more easily stated with reference to South America than any other continental portion of the earth's

surface. The Caribbean on the north, and the Atlantic and Pacific on the east and west, almost encircle it, while it has only a slender attachment to Central America by the Isthmus of Darien. The simplicity of the form of this portion of the western continent will appear from the accompanying normal figure, as will its position on the globe and its extent from the corresponding table of the positive position of its extreme points. Reference to the tables (pp. 204, 5) will afford the same means of comparison as given in other cases.

Cape St. Roque . . . . .	5° 28' S. Lat.,	35° 16' W. Long.
„ Horn . . . . .	55° 59' „	67° 16' „
„ Blanco . . . . .	4° 17' „	81° 16' „
Point Gallinas . . . . .	12° 25' N. Lat.,	77° 44' „

The mean area of South America has already been stated (p. 205) as 6,355,813 miles.

4 *The Coast Line*.—This is less indented and broken by gulfs or promontories than any other continental portion of the earth's surface. Promontories or peninsulas it has none commensurate to its extent, in this resembling Africa; those of St. Joseph on the south, and of Paria on the north, being scarcely worthy of mention, nor are indeed the Gulfs of Venezuela, Guayaquil or St. Patras; more so when compared with those gulfs and seas which give such importance to North America, Europe, and Asia; but the pride of South America is in her rivers, and their extensive estuaries give that entrance into the interior of the country which her more regular outline denies. The most indented portion of the coast line is to the south-west, where Chiloe and the neighbouring isles present, with the shores of the continent, an extensive coast line in proportion to the area, which is continued through the islands of the south. As already estimated, the proportion between the area and coast line is 576, the former being 5,136,000 square miles, and the latter 13,600 linear miles.

5 *The Watersheds*.—Equally regular is the distribution and position of the watersheds of the southern portion of the continent of America. The great Cordilleras of the Andes extend south-west, south-east, and south, throughout its entire length, in close proximity to the western coast; on the north sending off several spurs to the coast of the Caribbean Sea, and limiting the basin of the Magdalena and Orinoco: in the centre, at the head of the great valley of Marañon the chain is single, and solid, but to the south divides, enclosing the basin of Lake Titicaca; more southerly still it becomes again single, while decreasing in height and importance, and loses itself in the southern Archipelago.

On the north, parallel ranges, little known but of considerable elevation, separate the valley of the Marañon in its middle and lower course from the rivers of the northern coast. These are not, however, apparently connected with the Andes, but a level tract marked by the course of the Cassiquaire connects the valleys of the Marañon and Orinoco.

To the south of the Marañon the watershed is more continuous, and of considerable elevation, apparently connecting the Andes with the coast ranges, which form the limits of the basins of the Tocantins, St. Francisco, and La Plata, southward of which there are no mountains but the Andes, and some isolated ridges extending towards the coast.

6 *Orographical Classification*.—This is therefore extremely simple; the Andes forming the primary watershed, and the systems of Parime and Brazil the secondary; the course of the Marañon at right angles to the general trending of the primary watershed is a feature peculiar to this part of the world.

7 *Classification of Rivers*.—South America has four principal primary rivers, besides those of the western coast, which, by comparison, hardly deserve the name; the Marañon in the centre, the Magdalena and Orinoco on the north, and the La Plata on the south; these are of very various size and importance, yet even the smallest worthy from its size to take rank among the primary rivers of the world: there are also on the south, the Colorado, Rio

Negro, Desire, and other smaller streams; those falling into Lake Titicaca, and those which lose themselves in the lakes of the plains on the eastern side of the Andes, must be placed in this class: the others will all be secondary. Of these the Essequibo, Berbice, Paranyhyba, and St. Francisco are the most important and best known. The rivers of South America are remarkable, not for their number as in North America, nor for the variety of their classification as in Europe, but for their extent, the importance of their affluents, and the slight fall of their middle and lower courses.

8 *Of Geological Formation.*—This is also of much simplicity, and remarkable for the comparatively small development of the primary, transition, and secondary strata, of which so large an area is apparent on the northern portion of the American continent. The crystalline schistose formations extend throughout the length of the Andes, and the mountainous districts of the north and of the east coast; throughout the former also the later igneous rocks are extremely abundant. In the centre of the chain of the Andes, in Peru, about the Gulf of Venezuela, and in the valley of the Orinoco, secondary deposits appear; while the primary and transition series are limited to the districts of the head waters of the upper affluents of Marañon, and the eastern slopes of the Cordilleras of the Andes, with portions of the mountain districts of Parime, Brazil, and Uruguay. The tertiary formation has however a very extensive development, appearing throughout the entire length of the continent, at the eastern base of the Andes, forming in the centre the tablelands surrounding the middle basin of the Marañon; on the llanos of the Orinoco and on the south, the pampas of La Plata and plains of Patagonia, and in the valley of the La Plata exceeding 2000 miles in breadth and stretching along the basin of the Marañon to that of the Paranyhyba; while on the north it appears surrounding the mountains of Parime at their bases: the alluvial deposits rest upon this in the valley of the Marañon from the mouth of the Napo, and throughout the valley of the La Plata from the confluence of the streams forming its head waters. The northern coast from Cape St. Roque to the mouth of the Marañon is also covered with it.

Of South America, especially the western side, it may be said, as already observed of North America, that it has undergone many and considerable changes within the historic period. Of these, enough have been recorded not only to justify this conclusion but to indicate that others, to probably an extent little contemplated, have taken place already, and that many more equally considerable may be expected.

## CHAPTER XXXIII.

### WATERSHEDS AND RIVERS OF THE WEST.

- § 1. The primary watershed.—2. The southern extension.—3. The northern extension.—4. The central basin.—5. The rivers of the west.

**T**HE *Primary Watershed.*—The unbroken regular chain of the Andes, extending for more than 4000 miles from north to south, presents this peculiarity, that although in the centre, parallel ranges and detached peaks are found, yet throughout the greater part of its length the highest summits are in the line of greatest elevation, and that on the western side there are no transverse ranges of importance. The central portion of this range, extending from the Knot of Pasco to the southern limit of the Cordillera Reale, and the Alturas de Lipez, from the sources of the Marañon to those of the Pilcomayo and Saldado, for nearly 1000 miles, may be divided into two portions, the northern forming the upper valleys of the sources of the Yucayali, and

the southern embracing the plateau of Bolivia, or rather the valley of Lakes Titicaca and Uros or Pansa, and the River Desaguadero. Within these limits are several of the highest summits of the Andes, but not the highest, Aconcagua, 700 miles to the south, being of greater elevation. At either extremity parallel ranges are found; those on the north extend from the Knot of Pasco in three well-defined ridges, known as the Western, Central, and Eastern Cordilleras, of which the Western is the watershed of the country, the valley between it and the Central being the upper basin of the Marañon, as that between the Central and the Eastern is of the Huallaga, while the larger stream of the Yucayali flows along the eastern base.

The sources of the Yucayali may be considered as lying under the sixteenth degree of south latitude, rising to the west of the flank of the Cordillera Reale, while those of the Purus and Madera fall from the eastern slopes of the same range. It should seem therefore that here we have the characteristic feature observable in the central ranges of the great primary watersheds of the Rocky Mountains and Himalayah, and that the Cordillera Reale, its name and appearance notwithstanding, must be considered as subordinate to the range of the Andes of the coast, if of it the Central and Eastern Cordilleras are the northern prolongations; nowhere is the main chain of the Andes more regular or less broken than it is here, and it culminates towards the south in the peak of Sahama, 22,350 feet above the sea; while its neighbour Gualatieri rises 21,960 feet. The Cordillera Reale has also elevations nearly as great, the peak of Sorato being 21,290 feet. The Cordillera de Yuracarnes extends eastward from the centre of the Cordillera Reale between the sources of the Madera; and the elevated plateaux on the northern and eastern sides of these ranges no doubt extend far into the unexplored country between the Purus and Yucayali; the smaller affluents of the Marañon, the Yarani, Jutay, Jurua, and Tefic, having their sources in the slopes which would correspond with the axis of the Cordillera Real on the eastern side of the Madera, and not improbably it may be found that they are buttressed up by similar ranges, completing the cincture of the middle basin of the Great River, which would thus exhibit remarkable regularity: the upper waters surrounded by the giant ranges of the Cordilleras, its middle basin by the inferior ranges forming the limit of the lower basins of its affluents and of its vast silvas; while to the north and south of the plateaux in which these affluents have their upper courses, the llanos of the Orinoco and the Parana extend to the estuaries of those rivers, and from the point of their commencement, or of the divergence of the transverse ranges which enclose the valley of the Marañon, the prolongations of the chain of the Andes extend north and south round the basins of those rivers. As in North, so in South America, three principal basins are thus formed; the northern and central being even more intimately connected in the southern than in the northern portion of the continent, it remains to be proved whether this be so on the south as well; but it may be assumed, without much fear of error, that the upper valleys of the Rio Grande and Guapore do not afford great facility of communication between the valleys of the Marañon and La Plata, and that transverse ranges of some elevation and much irregularity present themselves in the valleys of the Beni and Purus.

To the south of the central mass of the primary watershed of South America, near the mountains already mentioned, the Pass of Atacama crosses the Western Cordillera at an elevation of 16,000 feet; near the centre, the Gualilas Pass is 14,750 feet above the sea; and here the Nevado, or Snowy Peak of Chipicani, rises 19,700 feet; farther north, the ridge of Aripigña and the cone of Chacain have a great elevation, that of the latter exceeding 20,000 feet; and still farther, those of Ambato and Corpuna, with the dome-like Nevado of Choquibamba, rise to about the same height. The breadth of the Western Cordillera may be seventy-five miles, and its mean elevation 16,000 feet; the mean breadth of the plateau of Bolivia may be 100 miles, and its mean elevation 12,000 feet; while the Eastern Cordillera cannot

be more than fifty miles in breadth, its mean height probably much less than 15,000 feet, and its culminating points, Illimani and the Nevado de Sorato 21,150 and 21,290 feet respectively; the appearance of these Cordilleras is very different, the Western consisting for the most part of trachytic dome-like masses, the Eastern of irregular serrated ridges and rugged peaks; on this therefore the glacier region is more extensive, descending to about 16,000 feet, the limits of perpetual snow being about 16,500 feet. The breadth of the entire mass of the Bolivian Andes may be 250 miles. It is from the northern flanks of the Nevados of Sorato and Illimani that the deep gorges extend through which the head waters of the Marañon, descending from these eternal snows and glaciers, rush to swell the volume of this mighty river; but to the south, the greater portion of the Cordillera Real is below the level of perpetual snow, and the passes by which it is crossed do not much exceed 13,000 feet in elevation. The Sierra Nevada of Cochabamba, or Cordillera de Yuracaras, may have an elevation of 17,000 feet, the greater portion, as its name implies, being above the level of perpetual snow. The northern limit of the plateau of Bolivia is the Knot of Vilcanota, 17,525 feet above the sea; beyond this the western chain is continuous, but less elevated than to the south, while to the east three irregular valleys are formed, in which the principal sources of the Yucayali are found; the central, approaching within seventy-five miles of the coast of the Pacific, flows at right angles to the axis of the Cordillera; but those on the north and south, being distant from each other more than 350 miles, flow parallel to that axis, their basin being limited by the irregular and broken extensions of the Cordillera Real, which again unite in the Knot of Pasco, culminating in the Nevado de la Vinda, 16,000 feet above the sea: the upper valleys of the Yucayali may have an elevation of 11,500 feet.

2 *The Southern Extension.*—To the south of the central watershed, the Andes of Chili extend from the twenty-first degree of latitude, in a direction diverging slightly to the west and east of south, forming one regular chain of about thirty miles in breadth, with a mean elevation not exceeding 12,000 feet, but culminating in the centre in the Peak of Aconcagua, 23,910 feet above the sea; this is, as already noted, the highest point of the entire chain of the Andes; to the south the elevations rapidly decrease, its nearest neighbour the Nevado of Tupungato is only 15,000 feet in height, while those of Osorno, Minchimadeva, and Yantiles, to the south of the fortieth parallel, do not exceed 8000.

From this portion of the Cordillera, transverse ranges extend eastward between the valleys of the rivers which fall into the Atlantic; the principal of these is the Sierra de Cordova, forming the southern limit of the valley of the Parana. On the west a granitic range forms the coast line, and encloses a valley corresponding to the greater depressions to the south, between the islands of Chiloe and the main, while the irregular mountains of Southern Patagonia, consisting of a series of ranges—prolongations of the Cordilleras of the Andes—culminate probably in Mount Stokes, 6400 feet above the sea. The snow line varies considerably in the Andes of Chili and Patagonia; under the fortieth parallel it is nearly 14,000 feet above the sea, under that of the thirty-third it sinks to 12,780, and under that of the twenty-seventh to 8300. In the Andes of Southern Patagonia, the glaciers, like those of Norway, descend almost into the fiords by which the coast is indented.

3 *The Northern Extension.*—This prolongation of the central watershed commences under the fifteenth parallel of south latitude from the Knot of Pasco; here, as already noted, three distinct chains appear; of these, the eastern extends to the north-east as far as latitude  $5^{\circ} 30'$ ; the central having a more northerly direction, extends further, and terminates in two spurs, round which the Marañon bends its course from the north to the east; the western, which is the highest, runs parallel to the coast, but this in only one point exceeds the limit of perpetual snow, in the peak of Huayllillas, until near the Equator, where Chimborazo, the third in grandeur among the giants of the Andes, attains to 21,424 feet above the sea.

The Knot of Pasco forms a plateau elevated 14,000 feet above the sea, the mountains round it not rising more than 1000 feet above its surface; it is about twenty-five miles long by twelve broad, and is covered with moss and peat, interspersed with barren rock and numerous small lakes and pools, three of which are important as the sources of rivers.

The Western Cordillera is continued unbroken to about the fourth degree of south latitude, but from that point to the Equator it is much less clearly defined, although the summits of this portion of the Andes are little inferior in general elevation to those of the central range. From the Knot of Loxa to that of Assuay, two parallel chains are however apparent, enclosing the valley of Cuenca, and culminating about 15,500 feet above the sea: further north two ranges are again seen, uniting again near Chimborazo, where the narrow wall of Chisinchi forms the watershed of the country, and again diverging to be again united in the Knot of Los Pastos, from which the plateau of Pasto extends to the north and east, 10,000 feet above the sea. The width of the Andes here may average 100 miles.

In these ranges, besides Chimborazo, there are the remarkable volcanic cones of Cazambe, Antisana, and Cotopaxi on the east, and of Pichincha on the west, the latter attaining an altitude of only 15,924 feet, the eastern being now the watershed of the country, and the peaks above-named rising to an elevation of 18,535, 19,137, and 18,075 feet respectively; to the north are the volcanoes of Cumbal, Chiles, and Pasto. From the Knot of Los Pastos two chains again diverge, enclosing the valley of Almaguer these again unite in the Knot of Las Papas, from whence three chains, or rather the three northern spurs, diverge to the north and north-east; of these the middle is the more important—this is known as the Cordillera of New Granada, or Quindiu, and presents the volcano of Purace, 17,934 feet in height, and the peak of Tólima, the culminating point to the north, 18,000 feet above the sea, and terminates between the two branches of the Magdalena, the eastern of which, known as the Cordillera of Suma Paz, extends to the north and east in the mountains of Merida and the coast chains of Venezuela, while the western, known as that of Choco, passing into the Isthmus of Darien, though of much less considerable elevation, is remarkable for its rugged and impassable character.

4 *The Central Basin.*—The existence of such a basin as that of Lake Titicaca, at an elevation exceeding 12,000 feet, surrounded by the highest summits of the Central Andes, has been considered singular, and it is so if only its elevation and isolation are considered; but the basins of the Salt Lake in North America, and even of Lake Lob, and the river of Kashgar, are not dissimilar in character or position, while the more elevated valleys of the sources of the Indus, and the less elevated valleys of the Columbia, resemble those of the Marañon, their elevation notwithstanding, as does the valley of the Sanpo. In all these cases, indeed, the difference is rather in the details than in the general characteristics of the situation. This valley, or plateau, as it is usually called, is estimated to be 12,850 feet above the sea, and to contain about 16,000 square geographical miles; its length may be 500, and its extreme breadth 130 miles. Lake Titicaca exceeds 100 miles in length, and covers an area of more than 2000 square miles; it forms a deep bay to the south, in the entrance to which lies the island from which the lake takes its name; its surface is 12,846 feet above the sea, and it is more than 700 feet in depth; it receives the waters of several small rivers, but the slope from the Western Cordillera being only 4000 feet, and from the eastern still less, the volume of its affluents is inconsiderable; it discharges its surplus waters by the Desaguadero into Lake Pansa or Uros, which, although not much less in length than Lake Titicaca, is disproportionately narrow, resembling a chasm in the rocks: the Desaguadero has a course of 190 miles. This basin, like that of the northern salt lake, is crossed by transverse ranges, but these do not exceed 16,000 feet in height, and therefore do not attain to the region of perpetual congelation. The most remarkable feature of the basin, next to its proximity to active volcanoes, is its mineral wealth. The temperature is exceedingly regular, the climate dry, no rain falls, and but little snow, except in

summer, and then, though frequent, not in considerable quantities. The soil is fertile, but cereals do not ripen; there are no trees, but the surface is covered with beautiful herbage.

5 *The Rivers of the West.*—From the rapidity of the slope of the Andes to the Pacific, these, though numerous, are inconsiderable; the more important are the rivers of Guayaquil, the De Loa, the Biobio, and the Osorno; these are generally rapid in their upper courses, of small volume, but expanding towards the mouth; that of Guayaquil being two miles wide, where it meets with the bay of the same name. The Biobio has a course of 200 miles, is also two miles wide at the mouth, and is navigable for boats throughout its whole length. The Callaculla and Maule are also considerable streams; the latter has a course of more than 100 miles, and is navigable for twenty for small vessels. The Maypo and Aconcagua are most valuable for irrigation. A chain of lakes communicating with the sea, occupies the extreme southern part of the valley between the coast range and the Andes.

## CHAPTER XXXIV.

### THE WATERSHEDS AND RIVERS OF THE NORTH.

- § 1. The secondary ranges of the north.—2. The primary rivers of the north.—3. The secondary rivers of the north.—4. Lake Maracaybo.

**T**HE *Secondary Ranges of the North.*—The eastern ranges of the Cordilleras have already been noted as extending round Lake Maracaybo to the mountains of Merida and the coast chain of Venezuela; these culminate in the Silla de Caraccas, 8600 feet above the sea, and terminate in a plain or plateau, having an elevation of 2000 feet. These must be considered as extensions of the primary watershed. The secondary watershed will therefore appear on the other bank of the Orinoco in the system of Parime or Parima, of which scarcely sufficient is known to justify description. The regular descent of the Orinoco and the rivers of Guyana by a series of cataracts, seems to confirm the opinion that it consists of several nearly parallel ranges, of which that of Imataca near the coast is the first, which does not exceed 3000 feet in height; to the south the chain of Baragnan corresponds with the narrows of the Orinoco, from which indeed it has been named; and south of this Quittima, or Maypures, forming the second cataract to the south; again the highest range, rugged and almost unbroken, culminates in Duida, 7150 feet above the sea. As these ranges gradually assume a southerly trending, they may not improbably be connected by some central knot, from which also the Sierra of Paicarama may diverge to the east and north, throwing out spurs, to the north of which Roraima is the culminating point, at an elevation of 7450 feet above the sea; and still further east, though more southerly, the Sierra Acaray and its extensions form the watershed of the country, and buttress up the tableland of Guyana, while forming the northern limit of the lower basin of the Marañon. Between all the ranges, elevated valleys of great fertility and verdant tablelands are found, which serve to fit this district for the habitation of a numerous and industrious population; the lower valleys are however subject to inundations, and the density of the vegetation, which consists principally of palm trees, renders them unhealthy. This system may extend 500 miles from north to south, and nearly twice as much from east to west; on the west, however, it becomes irregular and broken, permitting the junction of the waters of the Orinoco and Marañon, though beyond this point it is again developed between the Rio Negro and Japura, and its connexion, thus indicated, with the lower ranges of

the Andes, which support the tablelands of their eastern slopes. These mountains, nowhere approaching the limit of perpetual snow, are almost everywhere covered with forests, which prevent their outline from being easily traced.

2 *The Primary Rivers of the North.*—These are the Magdalena and the Orinoco. The former, as already noted, consists of two principal streams, which are confluent at the extremity of the Central Cordillera, nearly 200 miles from the sea. The principal stream is the Eastern, rising in the Knot of Los Papas, in a small lake of the same name, and flowing through a narrow valley, which gradually increases to fifty miles in width, at an elevation not exceeding 1500 feet; its total length may be 1000 miles, for nearly one-half of which it is navigable as far as the Cataracts; these lie under the fifth parallel of north latitude, where the valley is not more than ten miles in its greatest width in an extent of nearly 200 miles; its upper course is very rapid, but its principal affluents are the Soarez, Soganozo, and the Bogota, the latter remarkable for the Fall of Tequendama, 600 feet in height, by which it descends to the plain: in its middle course it bifurcates and forms the Island of Morales, forty miles in length. The average descent of the Magdalena has been estimated at twenty inches to a mile; this cannot be throughout its course, but should probably be confined to its middle waters. The Cauca or Eastern branch, is considered of inferior length to the Magdalena or Western, and is estimated at 500 miles from the confluence; its principal affluent is the Nechi: its upper course is through a narrow glen for fifty miles, and then through a mountain valley 3000 feet above the sea, 180 miles long, and about twenty-five miles wide: below this it forces its way with great rapidity through a narrow gorge for more than 100 miles, forming a succession of rapids and falls, below which the valley gradually widens, tending to the east to meet that of the Magdalena.

Below the confluence of the Cauca, the Magdalena flows northward through a wide and fertile plain; it has two principal mouths, which separate about sixty miles from the sea, enclosing an extensive delta: the northern, that of Savanilla, is the most considerable. The Eastern, the better known, then expands into several lakes, and terminates in the lagoon of Santa Martha, which unites with the sea by a narrow channel, having a bar at the mouth. There is also another channel communicating with the sea to the westward, which has been rendered navigable for vessels of shallow draught by art, and is called the Canal of Mahates.

The valleys of the Magdalena and Cauca differ in that the latter is subject to inundations, and is the more fertile, though the lower part of it is best adapted for pasturage; both produce all the ordinary tropical fruits and vegetables. The Plain of Bogota, 8000 feet above the valley of the Magdalena, extends above forty miles in length and breadth, is fertile, and has a remarkably temperate climate, with two rainy seasons; whereas the valleys below have but one: the grains and fruits of temperate climates are here cultivated, but in the mountain valleys above, rye and barley are the only cereals. The lower valleys of the Magdalena and Cauca are for the most part undulating, and covered with grass, interspersed with bushes; trees are rare, and comparatively so throughout the entire course of these rivers.

The sources of the Orinoco have not been ascertained; below the Cataract of Guahariboes it is joined by the Cassiquare, which unites its waters to those of the Maranon. This remarkable natural canal has a south-westerly course of 170 miles; it is 100 yards wide at its junction with the Orinoco, and above 500 where it joins the Rio Negro. There are in all probability many similar bifurcations connecting the waters of these great rivers. The upper course of the Orinoco is westerly, but in its middle course it trends north, and subsequently east; it must, however, be noted, that the Guaviare is probably the principal source of this river, and if so esteemed, the entire stream will have an easterly and northerly course: this river is said to be navigable for 200



miles, and its entire course must exceed 750 miles to its confluence with the Orinoco; it has its rise in the eastern slopes of the watershed of the Magdalena, and in close proximity to the sources of the Japura.

At the junction of the Guaviare, the Orinoco is a broad, deep, and rapid river, flowing over a rocky bed, and forming the cataracts of Maypures and Atures, connected by numerous islands, separated only by very narrow channels, but extending 8000 feet in breadth. Here Mount Uniana raises its isolated summit 3000 feet above the sea. From hence the rocky character of the country continues for above 170 miles to the confluence of the Apure; but the river is navigable from the confluence of the Meta, fifty miles below the falls. From the mouth of the Apure its course is eastward; the delta commences 150 miles from the sea, and above this point there is a remarkable whirlpool; below this the river does not exceed 100 yards in breadth, and flows with great rapidity, estimated at eight miles an hour. The delta is intersected by numerous branches; the southern and most considerable, known as the Boca de Navios, forms the island of Cangrejos, and is twenty miles in breadth where it unites with the sea; it has an extensive bar at the mouth. The other channels are known as Boca Chicas, *i.e.* Small Mouths, and are mostly navigable for vessels of light draught: ten of these are known, the most westerly being the Boca de Manamo Grande; the entire delta is covered with trees, of which the Mauritia palm is most numerous; the extent of the base of the delta may be 150 miles.

Of the affluents of the Orinoco, the Meta is the most considerable; this river rises in the Eastern Andes, near to the sources of the Guaviare, and is navigable to their base; its course exceeds 500 miles, and it joins the main stream fifty miles below the Cataracts; it has numerous affluents, for the most part navigable. The most northern of its tributaries, the Cassanare, falls from the Pass of Toxilla, leading to the Bogota. The other affluents of the Orinoco belong to its lower course. The upper course of what has been considered the secondary source, *viz.*, that from the east, giving its name, as usual, to the main stream, has many affluents; and those from the west rise in close proximity to the affluents of the right in the lower course of the river, having northerly courses, of which the principal are the Caura and Caroni. On the left the Apure is the most considerable, having several sources which are surrounded by the mountains of Ocana; its course cannot be estimated at less than 500 miles; it is for the most part navigable; as are its tributaries, especially the San Domingo; in its lower course before joining the main stream it frequently anastomoses.

The upper course of the Orinoco is, as might be expected from its bifurcation in the Cassiquaire, through a nearly level alluvial plain, covered with dense forests, and subject to inundations: this indicates a considerable fall from the mountains in which it has its source, as does the rapidity of the current, which is considerable. The middle and lower valleys of the Orinoco may be divided into the llanos and wooded plains; the former extend over the upper course of the Meta, and terminate in that of the Guaviare; the latter part extend over the valley of the Guaviare, the lower course of the Meta, and from thence to the Aranca.

The llanos or treeless plains have a surface of grass on a sandstone base, but are fertile, and when cultivated, productive, like the prairies of North America; here also the river channels are marked by a growth of brushwood, and the plains are subject to inundation in the rainy season, though for a longer duration, lasting for a month or more. These are most extensive about the lower course of the Apure, where a temporary lake, more than fifty miles in length and breadth, is formed by them; the waters rise from twenty-five to thirty-six feet. The subsidence of the waters leaves luxuriant pasturage for cattle, which is again dried up by the heats of summer, when the plains are covered with fine dust. The most elevated portion of these llanos does not much exceed 300 feet above the sea, towards which they slope gradually: they are shut in towards the north by low spurs extending from the mountains

of Venezuela, which stop the outfall of the waters; beyond these the wooded delta stretches to the sea.

The wooded plains of the Orinoco unite with those of the Marañon, and into them the wooded heights of the lower declivities of the Eastern Andes and mountains of Parime gradually subside. The mean elevation of these plains may be 750 feet, and they are covered with an impenetrable growth of magnificent trees, through which the only paths are those afforded by the rivers. The intense heat and constant moisture render them extremely unhealthy, but equally favourable to the development of vegetable life; the waters abound with amphibious animals.

3. *The Secondary Rivers of the North.*—A few small rivers fall into the sea from the northern slopes of the mountains of Venezuela, between the rivers Orinoco and Magdalena; there are also several which fall into the estuary of the Marañon; those examined by Shomburgk, on the south side of the estuary, the Guaini, Barima, and Amacura, were found considerable streams in their lower courses, and connected with each other by branches or bifurcations similar in character to the Cassiquaire; they are separated from the affluents of the Cuyuny by elevations not exceeding 500 feet, and are remarkable for the magnificent growth of the trees on their banks. The more important, however, of the secondary rivers of this part of South America are those of Guyana, of which the basin of Essequibo and its confluent streams may have an area equal to that of all the others.

The principal source of the Essequibo is probably that to the south, which may have its rise in the Sierra de Acaray, the southern limit of the mountain system of Parime, which, though 4000 feet in elevation, is covered with dense forests, interlocking with those of the Branca, the principal affluent of the Rio Negro, from which it is separated by the Sierra Canucu and spurs of the Sierra Pacaraima, from which and the Sierra de Rinocote to the north, it draws a considerable portion of its waters; its principal affluent, the Cuyuny, draining the valleys between the latter and Sierra Imatoca on the east, as the Caroni does on the west. These are separated by a transverse range, having an elevation of about 2000 feet. The southern sources of this river are in close proximity to those of the Corentyn on the east, and probably the position of the Demerara and even the Berbice between these rivers, might lead to their being, especially the former, classed among tertiary rivers.

The valley of the Essequibo is crossed by several granitic ranges, which cause rapids and falls, some of which, as that named after King William the Fourth, in the upper course, are of considerable size and great beauty. Those of Ourpocari are also worthy of notice: and the Yucorit Fall, formed by the Sevasinkie Mountains, is marked by a pillar fifty feet in height, of three granito rocks balanced upon each other. The lower falls are distant from the sea only fifty miles, to which point the river is navigable for small vessels; and here the granitic ranges begin with slight elevations of 200 feet; the stream being only 100 yards wide, but in its middle course it is frequently 1500, and often studded with islands, some of which are of considerable size; its lower course extends in a broad estuary, full of islands, which at its junction with the sea is more than fifteen miles wide. The valley of this river is well wooded, and fertile. In its upper course it receives only one considerable affluent, Smyth's River. The most interesting portions of its basin are those occupied by the Rupunoony and Cuyuny, the principal affluents of its middle and lower course.

The former of these rivers is by some considered the principal source of the Essequibo, but as it has less volume of water it must be considered the secondary source, which conclusion is justified by its intimate connexion with the source of the Brauca, tributary, as already noted, of the Rio Negro. The Walcooro and the Tocoto, sources respectively of the Rupunoony and Branca, both unite in the waters of Lake Amucu, which in the rainy season covers the whole intermediate country, but which in the dry season, reduced to a small extent, forms the natural source of the Tocoto; like the Essequibo, the Rupunoony is broken by numerous falls and rapids, those in

its upper course being over granite dykes. The valley of this river is less well wooded than that of the Essequibo, passing the Sierras of Saeraeru and Pacaraima, both remarkable for their barrenness, yet of no great elevation, not exceeding 2000 feet; while in its lower course the Sierra Conococon has its base covered with luxuriant forests; in the upper course of the river the savannahs are extensive, and remarkable for the richness of their herbage.

This river may have a course of 200 miles, and enters the Essequibo 240 miles from its mouth, and 200 from that of the Cuyuny, which has a course of 300 miles, and, as already noted, has its sources in close proximity with those of the Carouy and the small rivers falling into the estuary of the Orinoco.

The upper course of the Cuyuny is remarkable for the numerous anastomosing branches, which are formed in the rainy season through the rich alluvial soil of the valley. This may be 500 feet above the sea, and from it the surrounding mountains rise 2000 feet in elevation. From its upper valley the Cuyuny, now 500 yards in width, issues by the Fall of Kanaima, below which it is divided into numerous channels by well-wooded islands, and from this point rapids and falls succeed each other almost uninterruptedly for sixty miles; and this first series of rapids is succeeded by two others, which do not terminate till the confluence of the Cuyuny with the Magarony and Essequibo. The Magarony is indeed the principal source of the river known as the Cuyuny, and for the greater part of its course flows nearly parallel to the main stream on the west, as the Demerara does on the east, and at about the same distance.

The Demerara has a course of probably 250 miles in its middle course; at the Great Falls it approaches probably within six miles of the Essequibo: to this point it is navigable. It is a mile wide in its lower course, and where it unites with the sea, double that width; it has a bar at the mouth, with eighteen feet at high water spring tides.

The Berbice River is navigable to the Cataracts, 165 miles from its mouth, and to this point the tidal wave is perceptible: its upper course is like the other rivers, broken by many falls and rapids; its sources are not known.

The Corentyn is also broken by cataracts at about 150 miles from the sea, above this point it has two very considerable falls of thirty and forty feet respectively; its sources are, as already noted, in the Sierra de Acaray. In this river the tide rises thirty inches seventy miles from the sea, and thirty miles lower down it enters the plain which is continuous to its mouth; here it is one mile wide, and where it unites with the sea, ten miles, but it has only nine feet of water on the bar at its mouth.

The River of Surinam is only known in its lower course, which is navigable for barges; its estuary admits vessels of considerable size: but the Marony is a more important river, having its source probably in the Sierra de Acaray, and therefore not less than 500 miles in length: like the rivers already named, it is navigable for about fifty miles, admitting vessels of considerable size, and being at this point one mile and a half wide; its navigation for boats, interrupted indeed by falls, extends for 150 miles. The Surinam, Marony, and other rivers to the east, as well as the affluents of the Maranon, which correspond with them, appear to have their sources in the slopes of an elevated tableland formed by the eastern extension of the Parime system, which is stated to be remarkable for its fertility and the salubrity of its climate; in this differing so much from the valleys of the rivers, which in their middle and even in their upper courses are unhealthy from the density of the vegetation, and in their lower from the extensive deposits of mud which cover the whole coast line to the east of the Orinoco.

4 *The Lake of Maracaybo*.—This is a remarkable basin belonging to the system of secondary basins of the northern coast of South America: it is surrounded on all sides but the north by elevated ranges, but the lands forming its shore are low; on the west of its mouth is the isolated range of Sta. Martha already noticed, rising 18,000 feet above the sea: from the ranges which

form the cincture of its basin, Lake Maracaybo is said to receive the waters of above 100 streams, of which the most important is the Zulia, which is navigable for some considerable distance, and has a course of 170 miles. The lake itself is 120 miles in length, and eighty in breadth, with depth sufficient for the largest vessels; it is connected with the Gulf of Venezuela by a channel nearly twenty miles in length, and from five to ten miles in breadth: vessels of great burden cannot, however, enter the lake, in consequence of a shifting bar, having only fourteen feet of water on it, at the mouth of this channel. The water of the lake is fresh, excepting when strong northerly winds drive the salt water into the upper part of it. It abounds with fish, but not with turtle; its shores are only cultivated on the west, and are generally unhealthy: bitumen abounds on the north-east, where the surface of the ground is constantly inflamed; the waters of the lake are remarkable for their petrifying qualities.

## CHAPTER XXXV.

### THE RIVERS OF THE CENTRE.

§ 1. The Maranon.—2. The affluents of the north.—3. The affluents of the south.—4. The central table land.—5. The lower valley, and confluent streams.

*THE Maranon*.—The sources of this river are, in direct distance, from each other, seventeen degrees of latitude, i.e. above 1000 miles. The northern sources of the Napo being north of the Equator, and those of the Apurimac more than sixteen degrees to the south; the principal sources are in the Knot of Pasco and the Sierra de Vilcanota, nearly 500 miles apart; while the sources of the Yucayali, of which the Apurimac is the most important, are distant 750 miles in direct distance from the confluence of that river with the New Maranon, or Tunguragua, the other principal source; and this point, more than 1750 miles from that where the main stream joins the ocean: for this distance the Maranon is navigable for large vessels, and flows through a marshy level plain covered with one dense and continuous mass of forest, receiving the waters of numerous affluents: of these, some are rivers inferior in magnitude to few elsewhere, and of many the names are scarcely known. The great plain is towards the east, and about 400 miles in breadth, but measures in the centre to 800, and is not probably less towards the west; having an area which may be approximately estimated at 1,250,000 square miles. The principal sources of the Yucayali are in the Sierra de Vilcanota and the mountain Knot of Pasco; the southern source, the Apurimac, has probably an elevation of 14,000 feet above the sea, and collects the waters of a valley extending 250 miles in length from the northern watershed of Lake Titicaca to the Knot of Cusco, in which its principal tributary, the Pampas, has its rise. This portion of the upper valley of the Apurimac is noted for its beauty and fertility: the spurs from the mountains which extend across it are not elevated, are covered with verdure to their summits, and plentifully clothed with luxuriant forests, which descend into and fill the valleys, through which the rivers flow with great rapidity, forming numerous falls and cataracts. It unites with the northern source, the Janja or Montaro, after a course of 300 miles. The Janja has its rise in Lake Chinchaycocha, 14,000 feet above the sea, among mountains rich in deposits of silver, and descends for about 120 miles through a narrow gorge, into a valley, 8000 feet in elevation, remarkable for its fertility: its course is estimated as exceeding that of the Apurimac, and the united streams after their confluence are known as the Tambu,

which, after a northerly course of 200 miles, is joined by its most important affluent, the Yucay or Vilcamayo, from the right. This river, formed of two confluent streams, the Qullebamba and the Pancastambo, which descend from the eastern slopes of the Sierra de Carabaya; each of these has a course, probably exceeding 200 miles, and their united waters flow 100 miles further to the north before they join the Tambu: the waters of the Vilcamayo flow through long narrow valleys, nearly parallel, diverging north-east from the axis of the main chain of the Andes; not much below the mouth of the river, a considerable affluent, the Uruni, rising from two sources in the Andes, joins the main stream. From the confluence of this river the Tambu flows north-west for 100 miles, where it receives a considerable accession to its waters from the left in the Pachitra or Pachite, which has its rise in the slopes of the Knot of Pasco; from this point the river assumes the name by which its entire course is commonly distinguished: and as the Yucayali, flows 500 miles before joining the Marañon. The Yucayali is navigable for large vessels for 100 miles; above this, its waters are rapid, but used for the purposes of transit by the native inhabitants.

Between the Yucayali and the Marañon, the Huallaga, rising in Lake Chiquiaco, flows northward through the valley between the central and eastern Cordilleras. The course of this river is extremely rapid, and it receives no considerable affluent; sixty miles from its source its valley is only 6300 feet above the sea; below this the valley is narrow, and frequent falls break the course of the stream, which issues from the Cordilleras about 250 miles in direct distance from its source; the lower portion of this valley is about 2000 feet above the sea, well wooded, and very fertile. The lower course of the river is through the plain of the Marañon.

The New Marañon, or Tunguragua, issues from Lake Ilauricocha, 14,000 feet above the sea, through a deep gorge, in which, like the Huallaga, it descends 8000 feet; below this the valley opens; yet for the first 300 miles of its course it is not navigable; below this the valley again narrows, and the river is precipitated over the rocks in the Cataract of Rentema, below which the river is only 1230 feet above the level of the sea: from hence the river has a tortuous course, but is increased in breadth to nearly a mile: it issues from the mountains by a narrow chasm, 150 feet in width and nearly seven miles in length, like the canons of the north, through which its waters rush with great rapidity into the plain below. The course of the river among the mountains is about 700 miles; its upper valleys are cold and sterile, though rich in mineral wealth, and the lower not remarkably fertile. At the Pango de Manseriche, the river is about 2500 feet wide, and to this point it is navigable for vessels drawing five feet of water; and flowing through a nearly level plain, its fall is regular and its current equal—the former not exceeding two feet in a mile, and the latter three and a half miles an hour. The course of the Marañon through this plain is divided into two parts by the narrows of Paxis, or Strait of Obydos, situated 400 miles from the mouth of the river, and above the confluence of the Tapajos; where it is less than a mile in breadth; but above that point it exceeds three miles, and immediately below, four: to this point the tidal wave is felt, often rushing in with a bore dangerous even so far from the sea; below this the river rapidly increases in breadth, and at the mouth of the Xingu assumes a northerly course—its direction hitherto having been easterly; and lower still its width soon exceeds that of any other river in the world, being at the mouth 200 miles, or 50 more than that of the St. Lawrence. The mouth of the Marañon is occupied by numerous islands of considerable size; of these, that of Marajo, or Joannes, is the largest, being about 125 miles in length and breadth, the surface principally consisting of alluvial soil, rising gradually to the south; it has two navigable rivers, the Auajay and the Mapua, but the channel surrounding it is known successively as the Tagypura Rio das Bocas, and Rio de Para. The island next in size is that of Caviana, which is however only thirty-five miles long by twenty broad. The entire

course of the river is studded by islands; those formed by anastomosing branches being of great extent. The principal mouth of the river is the Canal de Braganza di Norte: it is about fifty miles wide, and is intersected by the Equator just to the south of the island of Caviana; so great is the volume of water poured out by this river, that the water about this island is seldom even brackish, and the sea is freshened by it many miles from the mouth.

The upper portion of this river, to the mouth of the Yarani, is known as the Maranon, between which and that of the Rio Negro it is called Solimas, or Solimoes; and from thence to the sea, Amazonas, or the Amazons. It is probable that the first and most proper appellation belonged originally to the lower course of the river. The entire plain of the Maranon is covered with forests, through which the rivers afford the only passage; and during the inundation, which is at its height in the upper course in January, in the middle in February, and the lower in March, rising fifty feet above the ordinary level, a large portion of the country on both sides of the river, and extending far up the course of its tributaries, is laid under water, the navigation of this river is remarkably facilitated by the wind, which, excepting during the period of the inundation, blows up the stream, the depth of which forms one of its most remarkable features, being throughout its navigable course nearly twenty fathoms.

2 *The Affluents of the North.*—The Maranon has some considerable affluents before its confluence with the Yucayali; they are all from the north: of these the Santiago joins the main stream near the Pongo de Maseriche; but the most important is the Paztaza, which has its source in the Patali, to the north of the Peak of Zunguragua; this stream is continued in that of Banos, which, by its junction with the Canelos, issuing from Lake Bobonaza, on the north forms the River Paztaza. The Banos may have a course of 150, and the Canelos of 100 miles to their confluences, below which the united stream has a sinuous course, in direct distance thirty miles, to the Maranon. The Banos receives numerous affluent streams. The mouth of this river is more than 200 miles in direct distance from that of the Napo, the most considerable affluent from the left in the upper course of the Maranon. The principal sources of this river are in two large crevasses in the eastern slopes of the volcano of Cotopaxi, which uniting, flow through deep narrow ravines; above which the Cerro Blanco, named "Bella Vesta," runs in romantic beauty: this river has two principal affluents from the right, the Anzupy and Arajuno, which join it respectively 170 and 200 miles in direct distance from its source, beyond which it receives numerous affluent streams from the left, falling from the south-western slopes of the Cordillera de Guacuamayo and the Volcano Sumaco, which terminates with its snowy cone that range to the north-east, the principal of these is the Pajanino, which may have a course of 200 miles, and is also remarkable for its mineral wealth, and the auriferous sands in its bed; it unites with the Napo fifty miles in direct distance below the Arajuno. The Coca, having its principal source in a lake to the north-west of the volcano of Antisana, but formed by the junction of numerous affluent streams, flows eastward to its junction with the Cozanga, in direct distance 150 miles; its principal affluent is the Quijos from the right, which, like the Cozanga, has its rise in the eastern slopes of Antisana. The Cozanga flows northward with a rapid current, through ravines at the base of the Cordillera de Guacuamayo, and unites with the Coca at a point 150 miles north-west of the confluence of the Coca with the Napo; from whence, bending in a circular arc round the spurs of the Cordillera, its course is from north-east to south-west, almost parallel with that of the Pajanino, uniting with the Napo at more than a right angle to its course; from that point to the confluence with the Maranon, 150 miles in direct distance, the Napo is navigable, as is the Coca, to the cascades of St. Raphael, near the centre of its great bend; it here receives the waters of some affluent streams from the right, the principal of which, the Curaray, rises in the Cordilleras, between

the sources of the Arajuno and Banos, and has a course of more than 400 miles, joining the Napo near its confluence with the main stream. The affluents of the Coca and lower course of the Napo from the left are not important, with the exception of the Aquarico, or Ora, which has its sources to the north of those of the Coca, and unites with the Napo after a course of nearly double its length. The Napo forms the limit between the mountain streams which are affluent to the upper course of the Marañon, and the rivers of its middle and lower course; the larger portion of its valley is formed of extensive plains of great elevation, but below the Cordillera de Guacuamayo it assimilates to the wooded character of the great plain of the Marañon; here also the river bifurcates, and forms numerous islands like the Negro, and indeed the main stream. The middle valley of the Napo is the Cinnamon country of the early Spanish writers; and the Bobonaza is, from this circumstance, and the town similarly named on its banks, known as the Canelos; the other principal products of this valley are the pita or agave; sarsaparilla is also abundant.

Two considerable affluents unite with the Marañon between the Napo and Negro, the Putumayo or Ica, and the Japura or Coqueta; the former, like the Huallaga, flows through a contracted valley, and receives no affluents of importance, though it has several sources in the southern slopes of the Knot de los Papas, one of which rises in the small Lake Sebondoi; the latter, also rising from many sources in the eastern slopes of the same mountains, has two considerable affluents from the left; it is broken by cataracts about the middle of its course, before entering the plain of the Marañon, and is the last affluent from the left which has the character of a mountain stream: in its lower course it anastomoses with the Negro, and probably with the Japura, as well as the main stream; its sources are in close proximity, as well with those of the Orinoco and Magdalena as of the Japura. The character of the next affluent from the left is altogether different; while hitherto the sources have been many thousand feet in elevation, those of the Negro rising in the chain which buttresses up the tablelands of the Eastern Cordilleras on the south, cannot have an elevation exceeding 5000 feet, probably not that; the highest level attained towards its principal source, the Naupes, under the seventieth meridian, being but little more than 1000 feet above the sea; and its secondary source, as usual giving name to the river, the Negro, rising in the northern spurs of the same range at probably no greater elevation, and communicating, as already noted, by the Cassiquaire with the Orinoco. This river is the most important tributary to the north of the Marañon; the upper waters of its principal source, the Naupes, flow through comparatively level uplands, from which it descends by the Great Fall of Jurapaxi Caxocira, and 100 miles below this a series of falls and rapids, some of ten or fifteen feet perpendicular height, and exceeding fifty in number, break its course for 180 miles. Fifty miles lower down another group of cataracts of great violence bring it to the level plain, from whence it flows 130 miles with uninterrupted navigation to the Negro; in this part of its course the Naupes is more than a mile wide; at its junction with the Cassiquaire, the Negro is not more than three-quarters of a mile wide; above that it has the name Guainia, as already noted, and does not exceed half a mile in breadth below the rapids, where the river flows in contracted channels with great rapidity among granite rocks, extend for twenty miles; this formation commencing about  $64^{\circ} 25'$  west longitude, and extending to the sources of the river, the Sierra de Jacamie presenting isolated peaks of a few hundred feet in elevation, while those of Curicuriari and Caboburi may exceed 3000 feet above this point. The islands are rocky, of sandstone, with alluvial deposits, yet a ridge of granite appears again opposite the mouth of the Rio Branco. This is the principal affluent of the Negro, and from the left, rising in the Sierra de Pacairama from two principal sources, which collect the waters from the extremities of its base, meeting near the centre, is a considerable stream, and remarkable for waters forming so strong a contrast with those of the Negro in colour,

as to have procured for it a contrary appellation : rising among rocky mountains its upper waters are pure and crystalline, but in its middle course they become charged with deposits which give to them a milky whiteness, and the other affluents flowing parallel to it are also white, though less strikingly so ; while the sources of the Negro and its affluents of the south, flowing through granitic districts, heavily timbered, are of dark-brown or black ; the Negro in its lower course assumes a jet black hue, but the upper course of the Naupes is white, as are the waters of the Japura.

Below the line of granitic formations, the Negro is more than four miles wide, and gradually increases until, for nearly 500 miles, it presents rather the appearance of an extensive lake studded with islands, than a river, being often twenty miles wide ; its numerous channels unite in two principal, which form one broad stream about ten miles from its confluence with the Marañon, which it enters 800 miles from, and not much more than 150 feet in elevation above, the Atlantic ; it has numerous affluents from both banks, though none very considerable but the Branco ; its length may exceed 1000 miles.

The line of cataracts on these rivers indicates the limits of a plain extending to the lower slopes of the Cordilleras, having an average elevation of about 700 feet above the sea ; it is covered with dense vegetation, but differs geologically from the lower plain, as already noted.

Below the Negro no considerable affluents flow into the Marañon from the left, though numerous comparatively small streams, falling from the southern and eastern slopes of the mountains of Guiana, fall into its lower course, and into its estuary. Of this portion of its valley little is known.

3 *The Affluents of the South.*—The character of these will appear from what has been already stated. Although in some respects dissimilar, the Madera on the south, will, like the Negro on the north, mark the change between the upper and lower affluents : those to the west of that river will be mountain streams, having great fall in their upper courses, while those to the east, though not affording the same extraordinary connexion which the Negro possesses by the Cassiquaire with the Orinoco, and having considerable altitude for their sources among the mountains of Brazil, yet bear no comparison with the torrent courses of the Huallaga or Purus ; nevertheless, on the south there is, as on the north, a terraced table land, through which the upper courses of the rivers, especially the Madera, flow ; the limits of which are marked by the falls and rapids which separate their upper from their lower navigation : in the Madera these are 450 miles from its confluence with the main stream, yet above them that river is navigable for small craft nearly to the sources of the secondary affluents, by which communication is obtained with those of the La Plata. It has already been noted that the smaller affluents of the south, Yarari, Jutay, Jurua, Tiffe, and Coary, between the Yucayali and Purus, have their sources in the slopes of this table land, which increases in elevation towards the west ; the latter river having a rapid and tortuous course through a narrow valley, and receiving no affluents of importance, but having its rise in the north-eastern slope of the principal watershed of the country in the Knot of Vilcanota. Next to the Purus, and parallel with its lower course, the Madera joins the Marañon, of which it is the most important affluent ; it has its rise from many sources, which form two confluent streams, the Guapore and the Beni ; the former has three principal sources,—the Marmore or Rio Grande, the Ubai or Magdalena, and the Guapore or Itenez ; of these the central, the Rio Grande, is the most important, having its rise in the Sierras of Potosí and Cochabamba, and receiving numerous affluents, principally from the left : the Beni has its numerous sources in the eastern ravines of the Sierra Reale, while the Guapore has its sources in the table lands of Matto Grosso, and flows with a north-westerly course at the base of the Sierra Geral. In its middle and lower course the Madera receives many affluents ; its entire length must exceed 2000 miles ; the broken water extends for 150 miles from the confluence of its three sources ; the descent of all the falls, thirteen in number



does not however exceed 160 feet, and the highest is only thirty ; above them, the river is only 500 yards wide, but even within the limit of the district of rapids and cataracts it extends to 2000. Notwithstanding the obstacle presented by the rapids of this river, it is the natural means of communication between the valleys of the Marañon and of the La Plata, the Guapore flowing through the plain of Moxos, which is separated from that of Chiquitos only by very moderate elevations : the level character of this plain, and slight fall of the river, lay the country about the upper courses of the Guapore and Marañon under water two months before the lower courses of those rivers indicate a great accession to their waters : the plain of Moxos is, for the most part, bare of trees, excepting by the watercourses, but presents verdant pasturage. The next affluent of the left, the Tapajos, is an important stream ; it is formed by the confluence of the Juruena and Dos Arinos rivers, the former rising in the eastern slopes of the Cordillera Geral, and the latter in the northern declivities of the Sierra Arapares ; by the Dos Preto, an affluent of the latter, communication is opened with the valleys of the Guapore and La Plata. This river is broken by falls and cataracts in the middle course, being similar to those of the Madera : in its lower course it widens, and at its mouth is four miles broad ; of the Xingu, the next affluent of the left, little is known, but it must exceed the Tapajos in length and volume of water.

4 *The Watersheds of the Centre.*—These are formed by the eastern spurs of the Central Andes, and by the mountains of Brazil. Of the former but little is known ; but it is apparent that on the south the same characteristics will be found as on the north, though more highly developed. The limits of the great plain of the Marañon, as well as the position of the cataracts of the Madera, point to the existence of table lands ascending to the base of the Cordilleras ; and these, as already noted, extend round the entire base of the Marañon and its tributaries, varying in elevation from 600 to 8000 feet above the sea, and in character from the densest forests to verdant upland pastures. The mountain system of Brazil is very extensive and varied in outline, forming the secondary watershed of the centre, and containing the sources of the great secondary rivers. As in North so in South America, the secondary ranges are not apparently connected with the primary ; the sources of the Madera and Pilcomayo, affluents respectively of the Marañon and La Plata, flowing north and south, like those of the Mississippi and Red River, being separated by an inconsiderable elevation. To the east, the Cordillera Geral forms the limit of the valley of the Madera, having a north-westerly and southeasterly direction ; presenting a lovely country, fertile, well wooded, and rich in precious stones. This is probably a transverse spur from the principal range, which has the line of its axis from west to east, and which throws off on both sides several similar, the most important of which is the Sierra Grande, dividing the basins of the Tocantins from that of the Araguay. These mountains culminate to the east, near the sources of the Rio St. Francisco, where the peaks of Itambe, da Piedade, Itacolumi, and Itabira, rise respectively 5960, 5830, 5750, and 5250 feet above the sea, the latter presenting a mass of the richest iron ore ; indeed, these mountains not only abound in mineral wealth, but in vegetable productions, being the choice field for botanical researches, even in South America. From the culminating point the coast chain extends north-east and south-west, forming the eastern cincture of the basins of the St. Francisco and La Plata, being continued north to Cape St. Roque, and southward to the estuary of the La Plata.

The country enclosed by these ranges has a mean elevation not probably much exceeding 3000 feet ; it for the most part consists of plains, interspersed with shrubs, below which the rivers flow through densely-wooded swamps.

5 *The Tocantins.*—This river can now scarcely be termed confluent with the Marañon, their united deposits having nearly obliterated the original connexion ; it is large and important, having its rise in the sources of two confluent streams, the Araguay and the Tocantins, of which the

former may be the most important, the one being formed by the junction of the Marañon and Parana, which have their sources in the Sierras Pyreneas and Tabatinga, the other rising from several sources in the Sierras Seida and Santa Martha, one of which, the Vermelho, affords communication with the valley of Para. Of these rivers, the Tocantins is the more rapid and broken, but the Araguay has nevertheless its falls and rapids; in its middle course it anastomoses, and forms the Island of Santa Anna or Banana, which is above a hundred miles long and about twenty broad; the eastern branch is known as the Furo; after this confluence, the united streams, broken by rapids and falls, flow through a narrow channel between rocks, for 150 miles. The estuary of this river is of considerable extent, and already noted as the Rio de Para, and as being in reality one mouth of the Marañon. The Tocantins has two mouths, separated by a long low island; these are called respectively the Bahias de Maritana, to the east, and Limoeiro to the west, and the river here has a width of about fifteen miles.

## CHAPTER XXXVI.

### THE RIVERS OF THE EAST.

§ Rio La Plata.—2. The rivers of the east.—3. Natural productions.

**RIO La Plata.**—The name Plata, given to the estuary of the confluent rivers Parana and Uruguay, is not so unsuitable as has been thought, its highest and probably most important sources being in the eastern slope of the Sierra of Potosi, the Alturas des Lipes, and the spurs of the Cordillera Reale. The mineral wealth of the basin is, however, both in gold and silver; its most precious productions, diamonds; but its present greatest commercial wealth resulting from the vast herds of cattle which feed on the Pampas.

The watersheds of this basin have been already described; they indicate the character of the streams which flow from them; on the west there are those flowing from the lofty Cordillera of the Andes; in the centre that which is considered the main stream, and which is so, as a means of communication, separated only by a slight elevation from the affluents of the Marañon, as already noted; and on the east, those which, rising among the mountains of Brazil and the coast ranges, drain the upland plains or Pampas of Brazil.

Of the two streams which form the Rio la Plata, the Parana is the more important, not only from its size and number of affluents, but from those of the right having their sources in the primary watersheds of the country; these, however, belong to that branch of it which is known as the Paraguay, and it is the singular characteristic of this river, that it draws its waters from extensive sources on the east and west, which are respectively within 150 miles of the Atlantic and Pacific Oceans.

The Paraguay may be said to be formed of two principal streams, the Pilcomayo and Paraguay. The former has its rise in the eastern slopes of the Andes, as already noted, from numerous sources, which unite after flowing some 350 miles; below their confluence, the river has a tortuous course, without receiving any considerable affluent: it is rapid, shallow, and not navigable; in its lower course it divides, forming two mouths, by which it joins the main stream; these are about 100 miles in length; its total length may be nearly 1000 miles. The Vermejo is the only other affluent from the right worthy of notice; it has two principal sources in the Cordillera Des Poblado, which forms the eastern watershed of the upper valley of the Pilcomayo; these are known as the Tarija and Lavayen, and from their junction this river is navigable; it has a tortuous course, exceeding 500 miles in length.

These rivers, in their lower course, flow through Gran Chaco, the northern part of which, or the llanos of Manso, is dry, and destitute of wood, but affords good food for cattle; the southern part is saline and sterile, yet in both narrow strips of woodland are found along the banks of the rivers.

The Paraguay rises in the table land of Parecis, in close proximity to the sources of the Tapajos, and overlapped more than 300 miles by the upper waters of the Madera and Xingu: in its upper course it receives two considerable affluents from the left, the San Laurenço and Tacoary, both navigable for the greater part of their length; the importance of the latter, as affording communication with the Araguay, has already been noted: the former has an affluent, the Cuyaba, also navigable. The upper basin of the Paraguay is limited, under the twenty-first parallel of south latitude, by the rocky ridge of Otaquis on the west, an extension of the spurs of the Andes, and by the Sierra Calbano, which extends from the Sierra Seida on the east; here its channel becomes contracted, and the accumulation of the waters of its upper basin wanting sufficient outlet after the rainy season, are dammed up, and cover the level plain above, through which at other times they flow with a gentle current. These narrows are known as the *Echo dos Morros*, and here the river flows with great rapidity through two channels, forming an extensive island; from this point it is navigable to the sea, and indeed, for boats, nearly to its extreme sources. The general course of this river is from north to south, with a slight westerly trending in its lower course; its length must considerably exceed 1500 miles.

The Parana has its sources in the reverse slopes of the watersheds of the Tocantins and San Francisco; its upper waters are collected from a table land bounded on the north by the Sierra Seida, on the east by the coast ranges and the Sierra Tiririca, and on the west by the extension of the Sierra Amambahy, which separates its valley from that of the Paraguay, which it resembles in the contracted character of the channels by which its waters leave their upper basin. The elevation of this basin varies from 1500 to 3000 feet above the sea; on the east, where it has the greatest elevation, its surface is broken and irregular; on the west it is more level, and varied only by isolated elevations; on the south it forms the plain of Guarapuaba: this extensive basin has forests at the base of the mountain, but the greater portion of its surface is destitute of trees and covered with coarse herbage.

The principal source of the Parana is the Rio Grande, which rises in the Sierra Mantiqueira, and after a course of 500 miles is joined by the Parana-hyba, and from this point the united stream is known as the Parana: its course is broken by falls and rapids, as is that of its important affluent the Tiete or Anhemly, which nevertheless, in its westerly course of 400 miles, is much navigated: there are also several affluents from the right, of which the Pardo is the most important; under the twenty-fourth parallel this river is four miles wide, but gradually contracting, is reduced to 100 yards in width, and forms a fall of about sixty feet in height, named *Salto de Sette Quedas*, from the seven channels which are formed by the rocky islands which impede its course, and from this cataract rapids extend to the mouth of the Curitiba or Yguasú, its most important affluent from the east: this has a course of 300 miles, is rapid, and broken by numerous falls, one of which, the *Salto de Victoria*, ten miles from its mouth, is said to be 120 feet in height; below this the Parana is partially navigable to the Cataract of Apípe, 100 miles from the mouth of the Paraguay, and from this point it is navigable to the sea for vessels of 300 tons' burden.

In its lower course, the only affluent of the Parana is the Salado; this river rises in the southern spurs of the Cordilleras Des Poblado and Des los Valles; its name, Salt River, expresses the character of its waters and of the country from which they are derived. The upper course of this river is extremely rapid, and in it, its waters are fresh: its entire length may be 1000 miles, for two-thirds of which it is navigable. There is another river of the same name, which, rising in the Pampas to the south, has a course of about

400 miles to the sea, at the extremity of the southern shore of the estuary of La Plata: the country through which it flows is not saline, but the sources of the river are, and its waters are impregnated with salt throughout its entire length. The River Dulce may perhaps be considered as an affluent of the lower course of the Salado; it rises from two principal sources in the plain of Tucuman, and flows into a salt lake of considerable but varying dimensions, called Los Porongos, from whence smaller streams appear to be connected with anastomosing branches of the Parana. The entire course of this river may be 500 miles, and as its name implies, its waters are sweet; it offers few facilities for communication. The Tereiro, a smaller river, is confluent with the Salado at its mouth; it is navigable for a considerable part of its course; this river is the northern boundary of the Pampas or plains of La Plata, which extend westward to the Andes of Chili, and southward to the Rio Negro or Cusu Lebu. The upper courses of this river and the Salado, drain an undulating fertile country, productive of corn, rice, maize, &c., well wooded, and of salubrious climate: to the east and south of this is the Salt Desert, many portions of which are not more than 200 feet above the sea: here many streams, generated in the western and higher portion of the country, lose themselves in the sand: the climate is intensely hot in summer, and the district altogether unproductive; it is bounded on the south by the Sierra de Cordova, which rising from a terrace 1000 feet above the sea, may culminate at 6000 feet: like similar mountainous districts in Asia Minor and elsewhere, as well as in other parts of America, these mountains present at the top extensive plains covered with grass; the valleys on the sides, and at the base of the range, are fertile and well wooded.

The Uruguay has a very considerable estuary, which gives it, in passing, the appearance of being a larger river than the Parana. This river rises in the Sierra Sta. Catharina; its principal affluents are the Ibicuy and Mirinaí, both from the left, the latter of which drains Lake Ybera; but its most important affluent is the Negro, also from the left, which joins it in its lower course, and being partly navigable, affords communication with Lake Mirim to the east: its length may be 300 miles. The Uruguay does not afford much facility for internal communication; its stream is rapid, and broken by several rapids and falls: its entire course may exceed 800 miles. The llanos of Entre Ríos, *i.e.*, between the Parana and Uruguay, are verdant level plains; similar are those on the eastern bank of the latter, but more undulating, and occasionally presenting a rocky surface. To the south of the estuary of La Plata the Pampas extend, as already noted, affording no very great diversity of feature, excepting in the western portion, which is saline, and presents numerous streams issuing in lakes connected with each other, but having no outlet to the sea; the surface is sandy, mixed with volcanic *débris*, but not altogether unfertile nor unsuitable to the production even of trees, where water is found; of these rivers and lakes the more northern are known as Guanacache, receiving the waters of the Mendoza and San Juan Rivers, which rise in the ravines of Aconcagua, and flow through the valleys formed by its projecting spurs. The Desaguadero connects these lakes with Lake Bevedero, which is again connected with numerous other small lakes, and receives the waters of the River Tunuyan; this river rises in the declivities of the peak of Supungato, and after flowing through a fertile valley in its upper course, passes by a ravine in the eastern chain of the Andes to the plain, from whence an anastomosing branch, recently formed, connects it with the Rio Diamante, which in its lower course is also termed Salado and Desaguadero; it terminates in Lake Urre or Urre Lauquen, *i.e.*, Bitter Lake, being more salt than those already mentioned: it is, like the former, connected with others immediately surrounding it. The Cerro Nevado and Cerro Payen limit this basin to the south, and from them rises the Colorado, which flows for more than 700 miles through the Pampas to the sea; it may be navigable for one quarter of its course; it is also known as the Cobu Leubu, as its neighbour to the south is known as the Cusu Leubu or Rio Negro. This river rises from two principal sources in the Andes: one

flowing from the north, the other from the south. The latter, called Rio de Encarnacion or Limay Leubu, carries the surplus waters of Nahuelhuapi, an extensive lake, to the main stream; the former is known as the Catapuliche; these unite under the fortieth parallel, and retaining the name Limay Leubu, are joined by the Rio Neuquen, which has its sources far to the north, near those of the Colorado; from the confluence, the river assumes the name Cusu Leubu, and to this point, *i.e.*, the base of the eastern chain of the Andes, through the valleys, between which and the western or principal chain its head waters flow, while the Rio Neuquen, having its course at the foot of the eastern chain, is also considered to be navigable for some distance, though its current is rapid; its length may be nearly 1000 miles, and although two miles wide at the mouth, narrows to one-fifth of that breadth some sixteen miles inland; its lower course is through a fertile country, its upper valleys are well wooded.

To the south of the Negro the sterile plains of Patagonia extend, an undulating surface, varied only by irregular rocky ranges, on the east and south; these present nearly a level surface on the top, but deep ravines separate them, and volcanic products abound. The only portion of this country, of which anything is well ascertained, is the basin of the Santa Cruz River, which flows with rapid current through a sterile valley, but is notwithstanding said to be navigable for 400 miles to the foot of the Andes: one of its sources is said to be in a large lake, Capar or Viedma; other streams of considerable size also flow through the plain of Patagonia, but of these little is known.

2 *The Rivers of the East.*—These may be classed into three systems: those of the north, partially connected with the system of the Marañon, of which the Paranyhyba is the principal; those of the centre, subsidiary to the San Francisco; and those of the south, which have their outlet in the Lake los Patos; of the former, the Gurupy, Turijapu, Maranhã, and Itaquiera, flow into the sea to the west of the Paranyhyba, the Croayhu, and other similar streams to the east; these all have their sources in the extreme spurs of the mountains of Brazil, and of these the Gurupy may have a course of 250 miles, the Turijapu somewhat more; the Maranhã or Maranhão is confluent at the mouth with the Itaquiera or Itapicuru, which flows into the Mosquito Channel, separating the island of Maranhã or Maranhão from the main; it is twenty miles long. The Itapicuru is navigable for 200 miles. The Paranyhyba has a course of 600 miles through a level plain, and is navigable to the confluence of the Balsas, one of its two principal sources, about 400 miles from the sea; it has several considerable affluents from the left, draining the lower valleys of the spurs of the mountains to the south. The plain of this river is undulating and varied, with frequent elevations of several hundred feet, spreading out into verdant table lands; these with the greater portion of the plain produce plentiful pasture; trees are only found scattered here and there, though often of lofty growth: the southern, which is the highest portion of the plain, rises 700 feet above the sea, and has extensive swampy meadows; the lower portions near the sea are dry and sandy. The Paranyhyba enters the sea by five principal mouths, enclosing a delta extending thirty miles along the coast; these are not navigable for vessels of great burden. The streams to the east of the Paranyhyba are of little importance.

The San Francisco rises from several sources in the southern and most elevated mountains of the system of Brazil, and may have its principal source in the north-west slopes of the culminating peak of Itambe; this source is known as the Rio das Velhas, its secondary source to the west is estimated as rising 3000 feet, and their confluence under the seventeenth parallel is estimated as 1700 above the sea; to this point its current is very rapid, but a little lower down it becomes navigable, flowing through an elevated valley, and being 1000 feet above the sea 500 miles from the confluence of its sources; in this portion of its course it receives numerous affluents from the left; lower down, it is broken by rapids and falls, the most considerable of which, those of Alfonso, are fifty feet in height; from the lowest of these the river is navigable 200

miles to the sea, which it enters by two mouths, of which the northern is two miles wide, but only deep enough to admit small vessels: the southern is narrower but deeper. The entire course of this river may be 1500 miles: its upper valleys are fertile, but salt plains are found on its left bank, and the country about its lower course is comparatively arid and barren, producing little but grass; the tidal wave is felt in it fifty miles from the sea.

Of the rivers to the south of the Francisco, the principal are the Belmonte, the Doce, and Parahyba: the former, more properly the Rio Jequitinhonha rises from two principal sources in the Sierra Freo, and may have a course of 500 miles, as may the Doce and the Parahyba; the latter has several considerable affluents, of which the Murinhe is the chief; its course is parallel to the coast between the ranges of the Sierras Espinhaco and Des Orgaos. Lake Patos is an inlet of the sea at the mouth of the Rio Grande de Sul, extending 140 miles in length and forty in breadth, it is connected with several other lakes by channels like itself, navigable for small craft; of these, Lake Mirim, to the south, is the most important, being 100 miles long by twenty broad, and receiving the waters of several rivers; this appears to have two divisions, the southern of which is known as Lake Mangueira, is narrow, and discharges its surplus waters into the sea by a small channel, the Tajim, while, by the Mirim, the lake of that name is connected with that of Los Patos: the River Jaculy, which has a course of more than 300 miles, falls into Lake Los Patos, and the Yaguaron into Lake Mirim; both flow through fertile and beautiful valleys, and are navigable for the greater part of their courses. These lakes are separated from the sea by sand dunes, with occasional swamps and meadows; but to the west, in the interior, rich pastures extend through the valley, interspersed with copses and groves of fine timber trees. The temperate climate of this valley makes it productive in the grains and fruits of Europe.

3 *The Natural Productions.*—No division of the surface of the earth can be esteemed so rich in natural productions as South America, when considered with reference to quantity. Hitherto her mineral wealth has made her the treasury of the world for the precious metals; and even since in the production of gold California and Australia have proved more than rivals, in that of silver she stands alone; while her other minerals, until now obscured by those esteemed more precious, are beginning to find their true value, and the coal-fields of Chile and Patagonia will before long not only speed the returning steamer from Australia, the Eastern Islands, and China to Europe, but assist in opening up the interior by means of the ramifications of the great river systems by which the surface of the Continent is drained.

Although the geological formation of South America appears simple and regular, yet variety of substance is not wanting on its surface, and the wide extent of volcanic action gives a prominence to recent igneous formations not elsewhere to be found. The precious stones obtained in the central districts have already been noted. But the vegetable productions of South America are the most remarkable, not only on account of what we already know of them, but as affording with Africa and the Eastern Islands the most tempting fields for botanical researches; the vast silvas of the Muranon and Orinoco, the upper valleys of the Uruguay and Parana, the mountains of Brazil and Parime, and even the valleys and slopes of the Andes, have much that yet remains to be explored.

It has been remarked that the vegetation of South America is partial, that the local floras are distinct, that "particular families of plants prevail in different localities, and predominate so exclusively where they occur as to change the appearance of the forest," indeed, that "almost each tributary of the great rivers has a flora of its own;" but still the main divisions may be noted without difficulty by their general characteristics. The coasts of the north are covered with numerous species of deleterious euphorbiæ, especially the manchineel, with the mangrove and avicenna; here the poisonous strychnia and the creeping ourari abound; but here also medicinal plants, so plentiful to the

south, are not altogether wanting, and "groves, whose rich trees weep odorous gums and balm," are characteristic of the upper waters of the rivers; here also are found forests of gigantic plantains; trees also of singular properties are found here; one laurel produces essential oil which will dissolve caoutchouc. The *palo de vaca* or cow-tree, described by Humboldt as confined to the Cordilleras of Venezuela, yields its milky juice, scarce inferior to that from which it is named, in great abundance; and the soap-tree, *sapindus japonaria*, justifies its name by its usefulness; and if less singular, the cassada, chocolate-palm, and cacao are not less valuable.

Like the plains of Asia Minor, the east of Europe and Asia, the llanos of the Orinoco and of Guiana are after the rains carpeted with brilliant flowers; and these must yield the palm to the varied colours which contrast with the white summits and dark sides of the Cordilleras of the Andes; while even the richness of the tints of the gentian, which peeps forth from their perennial snows, will scarcely compare with the hues which in so wonderful variety deck the gigantic forests of the Marañon. These have, however, been so fully described by Humboldt and others, that the beauty of the flowering forests of tropical America can be well appreciated: nor is their utility less remarkable than their beauty; the pita or agave alone would be well worthy mention, as affording every fibre necessary for those manufactures to which hemp is applied in Europe: but this is more particularly the district of medicinal trees, although the true bark, the cinchona, is confined to the Cordilleras of the Andes; here also the mora and numerous other trees best fitted for the builder's use, are in the greatest abundance. Contrasting with the richer vegetation of the valley of the Marañon, the less fertile districts of the mountains afford forests of stunted deciduous trees, while the grassy plains of the east present myrtles instead of the mimosas of the north: the cactus is abundant on all sandy soils, and its different species extend from Patagonia to the Lake of the Woods. Some of the larger afford wood for industrial uses, and on them the cochineal insect feeds.

The forests of the Parana and Uruguay are but little inferior to those of the Marañon, and have also their peculiar characteristics: here are found the algaroba, an acacia, producing flour from which a kind of bread is made and liquor distilled; and the *jerba mati*, the leaves of which have been constantly used as those of the tea plant.

The flora of the Andes differs, not only in latitude, but on the opposite sides; in the centre the western slopes are bare, but on the eastern the vegetation is of the most luxuriant character; arborescent plants do not however exceed 14,000 feet in elevation; the Alpine plants extend to above 16,000; grasses and mosses succeed, and at 21,878 feet of elevation the snow lichen alone is found.

The Andes of Chili and Patagonia are remarkable for their vast forests of *araucaria*, supplying food for the natives. These, when burnt, afford a remarkable phenomenon, being succeeded by a thick growth of dwarf oak; it has been remarked, that "the ancient and undisturbed forests of Pennsylvania have no undergrowth, and when burnt down they are succeeded by a thick growth of rhododendrons:" it might be added, that further north the burning a forest of spruce fir produces a copse of white birch bushes, so true is it that the vegetation which follows the burning of primeval forests is quite unaccountable.

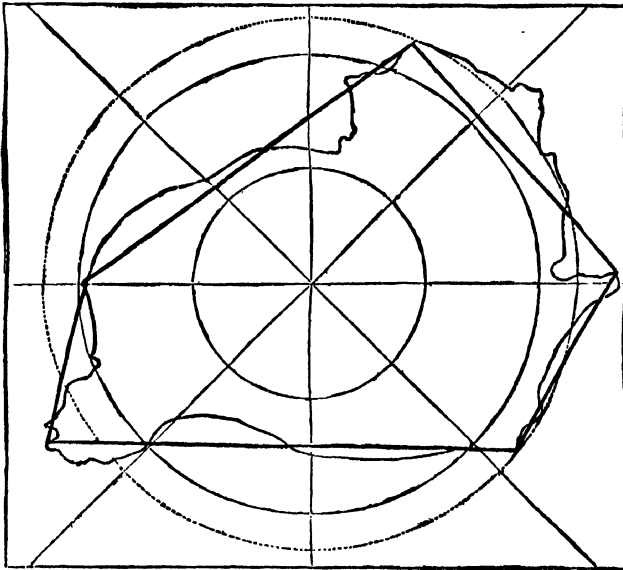
While the vegetation of the more elevated portions of the southern Andes is similar to that of the southern coast, all the vegetable productions being dry and stunted, the valleys present a flora comparable with, and closely allied to, those of southern Africa and Australia, which, extending upwards, mingles with the plants of the Alpine region. There, as in Europe, the southern flora is connected on the west, south, and east with that of America, Africa, and Asia, so the vegetation of South America presents close analogies with that of the southern extremity of the Eastern Continent, uniting the extremities of the Atlantic and Pacific Oceans.

## CHAPTER XXXVII.

## THE OCEAN, ITS COASTS AND ISLANDS.

§ 1. The Antarctic continent and its islands.—2. The islands of the Southern Pacific.—  
3. New Zealand.—4. The neighbouring islands.

**THE Antarctic Continent.**—This extensive but inaccessible and uninhabitable mass of land, occupies an area corresponding very nearly to that of the Arctic Sea; projecting towards South America and Tasmania beyond the Antarctic Circle, it is contracted on the other sides, forming an irregular hexagonal figure, 2880 miles in length and 2040 in breadth, and having an area probably exceeding 4,000,000 square miles, as indicated by the subjoined normal figure.



The positive positions of extreme points are thus indicated:—

Sir James Ross farthest . . . . .	78° 4' S. Lat.,	161° 0' E. Long.
Mount Erebus . . . . .	77° 33' "	166° 58' "
Mount Sabine . . . . .	71° 42' "	169° 55' "
Adélie Land, Geology Point . . . . .	66° 35' "	140° 10' "
Mount William . . . . .	64° 45' "	63° 51' W. Long.

Of this continent, Graham's Land, Louis Philippe Land, Joinville Land, Alexander the First Land, Adélie Land, Sabrina Land, and Victoria Land, named respectively by Briscoe, D'Urville, Bellinghausen, Balleney, and Sir James Ross, form portions. It may suffice to say, that the eternal snows which cover it are only varied by projecting black rocks and lofty volcanic cones; of these, Mount Sabine and Mount Terror may exceed 10,000, and Mount Erebus 12,000 feet in elevation above the sea—the latter was in action when first discovered. The coast appears to be formed for the most part of dark volcanic rocks, behind which the land rises 3000 feet, but on the coast of Adélie Land, perpendicular walls of ice were seen 200 feet in height. The



outline of the coast appears to be irregular and deeply indented, affording resort for the black whale, seals, &c.

In close proximity to this, several islands and groups of islands have been discovered; of these the most important are the South Shetlands and South Orkneys, to the north of Graham Land and opposite to Terra del Fuogo. These are mountainous, rocky, and barren, presenting indeed few, if any, traces of vegetation, the coast high, bold, and steep; they abound in amphibious animals and waterfowl.

At the other extremity, under the 160th meridian, are the Balleney islands. This group consists of five islands, of which Young Island is the principal, culminating, according to Balleney's estimate, at 12,000 feet above the sea. They are volcanic, presenting evidences of recent action. Between Balleney Islands and New Zealand, several scattered islands are found; between them and the South Shetlands and Orkneys, there are none south of the sixtieth parallel, while  $10^{\circ}$  further north there are only the uncertain group, named after the *Nimrod*, under the 168th meridian, and the outlying group of Sandwich Land and South Georgia. No portion of the ocean presents so unbroken a surface as this; it may be said to be without land for  $170^{\circ}$  between Cape Horn and New Zealand to the east, and if the *Nimrod* group be rejected, above  $100^{\circ}$  to the west.

2 *The Islands of the Pacific*.—The groups of islands alluded to, may therefore be considered as connecting links between the extremity of South America and the Antarctic Land; and, like Terra del Fuogo and New Zealand, they are volcanic in their origin.

Emerald Island, like *Nimrod* Islands, must be considered as doubtful. Macquarie Island is about twenty miles long and twelve broad, it lies under the 159th meridian, and in  $54\frac{1}{2}^{\circ}$  south latitude; it is represented as the others are, as barren and inaccessible, and rising 1500 feet above the sea.

Campbell Island, under the 169th meridian, and in latitude  $52\frac{1}{3}^{\circ}$ , is about twenty miles in circumference, and presents some good harbours; the shores are in many places 800 feet high, but the extreme height of the land is not probably more than 1500 feet. Trees grow here in sheltered places, but are most frequently inclined towards the east by the prevailing winds.

The most important of these islands are, however, the Auckland Group, so named by Bristow in 1806. These present remarkable basaltic formations, and rise in rounded hills not exceeding 1500 feet in height, covered with grass; at the foot of which a forest of gnarled and stunted trees of fir and maple extends; it consists of one large and several smaller islands, the former may be thirty miles long by fifteen broad. There are several good harbours. Cattle thrive well, and the climate is mild, but subject to violent gales.

The distances between these islands and the main lands, are from Terra del Fuogo to the South Shetlands 450 miles, from the Antarctic Land to Emerald Isle 540, and from the same point to South Cape, New Zealand, 1150 miles.

3 *New Zealand*.—As forming the natural limit between the Pacific and Indian Oceans, Australia and Van Dieman's Land must be considered apart from them, and, in the former, as New Zealand presents the most considerable surface, so it affords the greatest interest. This is a group of three islands. Of the straits which separate them, the northern is from twelve to seventy-five miles wide, and the southern from thirteen to twenty. The southern island is inconsiderable, the central the largest, and the northern remarkable for the extremely irregular outline of its coast; this outline is of an irregular boot-like shape; the long narrow promontorial extension of the northern island being to the north-west, with deep bays opening to the west and north-east. From the extreme north to the south point of the northern island, may be in length 450 miles, and from the east to the west 250, forming a curved cross; while the middle island, of more regular form, is 400 miles long by 150 in its greatest, and seventy-five in its least breadth. The southern is of triangular

shape, and in length and breadth about forty-five miles. A group of rocky islets extending over an area of about eight miles square, named by Tasman Three King Islands, lies off Cape Maria Van Diemen, in latitude  $34^{\circ} 27'$  south, and longitude  $172^{\circ} 36'$  east, which is the north-west point of a peninsula, connected with the land to the south by a narrow rock formed of sand-hills and swamps; to the east of which Mount Camel rises 500 feet above the sea. Here deep inlets formed for the most part by basaltic rocks commence, and form the characteristic feature of the eastern coast, interspersed with sand-hills and occasional mangrove swamps; of these inlets, the principal are Wangaroa Harbour, where the cliffs are lofty and the entrance only 450 feet broad, yet forming an extensive sheet of water within: the Bay of Islands containing numerous anchorages; and Wangaruru Harbour, below which Hauraki Gulf stretches more than fifty miles to the south, with an average breadth of ten miles, abounding with harbourages; of these, the most important is the harbour of Waitemata, receiving the river of the same name, and navigable for large ships for eight miles; while from the extremity of the boat navigation to the harbour of Manukao on the west side of the island, is only one mile and a half in one direction, and only a quarter of a mile in another. These inlets are surrounded by volcanic cones of small elevation, indeed not exceeding 300 feet. The southern extremity of Hauraki Gulf receives two considerable streams, the Thames and the Piako, which flow through fertile and well wooded valleys. Wai Hekeh Island lies off the entrance of Waitemata Harbour, Olea or Great Barrier Island, forming with others a considerable group at the northern extremity of the gulf. To the east the Bay of Plenty extends for above 100 miles, presenting a coast elevated by recent and continued volcanic action, covered by islands, one of which, White Island, though low, is in constant ignition, and valuable as producing sulphur; lignite is also found in many places in large quantities. The centre of the bay is marked by Mount Edgecumbe, rising from an extensive plain to the east, the coast is again high and rocky, terminating in East Cape in latitude  $37^{\circ} 42'$  south, and longitude  $178^{\circ} 39'$  east, a truncated cone 350 feet high, joined to the land by a narrow sandy neck.

The western coast to the mouth of the Hokianga river is comparatively regular, rising gradually towards the south, and beyond that point being high and rugged, unbroken for about the same distance to Kaipara harbour. The former of these is described as a magnificent estuary, receiving more than one navigable river having their rise in the hills from the opposite slopes, of which the water pours into Wangaroa harbour and the Bay of Islands. In the south the watershed extends from sea to sea, and on its southern slopes the Wairoa river is generated, which may have a course of seventy-five miles, and receiving several affluents, flows into a broad estuary forming the northern arm of Kaipara harbour, as the Kaipara does the southern. This is more properly an inlet fifteen miles long by two broad, and approaches closely to the harbour of Waitemata.

Manukao is another extensive inlet, differing in character from those to the west, but corresponding to those on the east coast, the country round it being low, of volcanic formation, and destitute of trees, while that to the north is lofty and well wooded; it extends fifteen miles in length and ten in breadth.

To the south of Manukao the coast bends to the west, forming an extensive bay, terminating in Cape Egmont, in latitude  $39^{\circ} 20'$ , marked by Mount Egmont, an extinct volcanic cone rising nearly 9000 feet above the sea from a level plain, and covered for more than 1500 feet from the summit with perpetual snow. This seems to be the most westerly of several volcanic summits of considerable elevation which stretch across the island, of which Ruapelin may be the central as well as the culminating point, and from which the Ruahine mountains extend to the south; and from this point the waters of the Waikato river flow to the north, and the Wanganui to the south.

The head waters of the former are collected in Lake Taupo, which may

be twenty miles long by twelve broad: and about seventy-five miles to the north the river Waipa, rising in the northern slopes of the Rangototo range, is confluent, and the united streams fall into the sea about thirty miles to the south of Manukan harbour. This river may be navigable for vessels of fifty tons for nearly 100 miles. The coast here consists of sandstone cliffs, and farther south of sandy downs, broken by the harbour of Wangaroa, remarkable for its limestone cliffs and lofty well-wooded hills of Astea and Kawia, besides numerous small streams.

To the south of Point Egmont another wide bay forms the north side of Cook's Straits, into which the Patra, Wanganui, Wangaito, Rangitiki, Manawaku, and other streams flow: vessels of 200 tons may enter the Wanganui, which is, as is also the Manawaku, 900 feet wide at the mouth. These streams rise far in the interior. Kapiti or Entry Island, about twenty-five miles in circumference, lies off this coast; it is lofty and well wooded.

The southern extremity of the northern island is formed into deep inlets by the Tararua and Remulaka ranges; on the west, Port Nicholson, an extensive landlocked harbour, is formed by the bold projecting peninsula, terminating in Cape Sinclair, it receives the waters of the Hutt river; on the east Palliser Bay extends for twenty-five miles, its open roadstead receiving the waters of Ruamahanga river; this river flows through an extensive valley about ten miles wide, and forms at its southern extremity two lakes covering an area of 50,000 acres, these are only open to the sea when the accumulated waters break through the sandy barriers thrown up by the southerly winds.

The south-east coast of this island is unbroken from Cape Palliser, in latitude  $41^{\circ} 37'$ , to Cape Matana Maui, in latitude  $39^{\circ} 41'$ , the line of mountains parallel with the coast form the watershed of the country; farther north Hawke's Bay, about forty miles in breadth, surrounded by comparatively low lands, and receiving the waters of the Wairoa, a considerable stream; and from hence to Cape East the coast is irregular, rocky, and broken.

The middle island is far more regular in shape than the northern, and in proportion embracing a much more considerable area. The central watershed appears to be situated at about one-third of its length from the north, and from thence passing along the west coast leaves open an extensive plain on its longer slope to the east; on the north the mountains divide, trending north and north-east, and rising above the level of perpetual snow. These ranges are separated by the deep ravines through which the waters of the Kawatiri or Buller river, the Wairau or Providence river, and the Motueka river flow to the south-west, north-east, and north respectively, to the sea; the mountains culminate in Mount Arthur on the west and Mount Kaikora on the east, the latter exceeding 9000 feet in height.

The northern coast of this island is extremely indented and irregular in its outline; in the centre it opens from the mountains, projecting into the sea, and forming islands and promontories, separated by deep, narrow, and tortuous sounds or fiords; while Blind Bay stretches far to the west, and the smaller expanse of Cloudy Bay forms the eastern limit.

Blind Bay has in its western extremity a deep indentation called Coal or Massacre Bay, which is protected from the north by a long spit of sand stretching from Cape Farewell, the most northern point of the island, for fifteen miles to the east. This bay receives the waters of two rivers, the Hairiri or Aoere, and the Takaka, the valleys of which are fertile; coal is found in abundance and of good quality on the eastern side of the bay, which forms a good roadstead; and is about ten miles in breadth. The more southern and principal indentation ought perhaps to be known as Tasman Bay; it may extend thirty-five miles between Separation Point and D'Urville Island. On the west the coast is rocky, with deep ravines heavily timbered, through which torrents rush to the sea; here is the Adele Island and Astrolabe road of D'Urville; to the south is the Motueka river, which rises far to the south, near the sources of the Warrau and Matuki, in the table land known as

Ingestrie Plains ; it may have a course of seventy-five miles. The Waimea, a small river, falls into the bottom of the bay, having an island of the same name opposite the pool formed by its waters, and at the base of the rocky eminences which form the eastern side of the bay, the still smaller Matai forms an extensive lagoon ; beyond which a bank of boulders, stretching for six miles parallel to the coast, at only a quarter of a mile distant, forms the Harbour of Nelson.

D'Urville Island, the Rangitoto of the natives, is about twenty miles in length by five in breadth ; it is lofty, rocky, and covered with timber ; on the north of this island is Port Hardy, an excellent harbour. To the east is Admiralty Bay, which extends for about seven miles from the east to west, and communicates by an opening about a mile in width with Pelorus Sound, an arm of the sea, extending among lofty cliffs and rocky islands covered with dense forests for nearly thirty miles into the land ; it is from two to three miles in breadth, and the cliffs are from 2000 to 3000 feet in height. It has numerous bays and harbours, and receives the waters of the Pelorus and Kaituna rivers at its southern extremity ; the former has its rise in the same table land as the Wairoa, and the latter affords communication with Queen Charlotte's Sound ; to the east this is of the same character, but less narrow and intricate than Pelorus Sound, and on the west side has the Ship Cove of Cook, the Totaranue of the natives, a most excellent harbour. East Cove and West Cove, deep inlets, terminate the bay to the south. The rocky peninsula which separates these sounds is well wooded, extremely picturesque, culminating to the west of Ship Cove at 2000 feet above the sea. The east side of Queen Charlotte's Bay is formed by Arapawa, or Wellington Island, of irregular form and about fifteen miles long. Cloudy Bay extends to the south-east about twenty miles ; on the north, Port Underwood approaches closely to Queen Charlotte's Sound ; here the shore is rocky, and the centre of the bay is the mouth of the Wairau, which may have a course of 100 miles, and receives several affluent streams, but is only navigable in its lower course for small craft, and separated from the sea by a bar ; the valley through which it flows is fertile, as is the Wakefield or Kaiparatchau on the south.

The coast to the south of Cloudy Bay is rocky and almost unbroken for eighty miles ; here the river Hurunui, having its source in a fertile table land, falls into the sea ; and below, the coast forms a deep bay, terminating to the south-east in Banks Peninsula. Pegasus Bay receives the waters of some small streams and of Courtenay river, the Waimakariri of the natives, which rising among the snowy mountains to the west may have a course exceeding seventy-five miles ; it has several affluents, draining the Wilberforce Plains, is navigable for small craft in its lower course, but has a bar at its mouth.

Banks Peninsula is about thirty miles from west to east, and twenty from north to south ; at its junction with the main land are Ports Victoria and Albert, formerly called Ports Cooper and Levy, both excellent harbours, but the latter is the less exposed ; the former is also known as Port Lyttelton, from the town of that name recently established there. To the south is Akaroa harbour, of similar character, but having a narrow entrance. This peninsula, though rugged and mountainous, is in many parts fertile and covered with timber : to the south-west extends the ninety-mile beach ; here a narrow bank of shingle, 17 miles long and about half a mile broad, forms Lake Ellesmere, the Waihora of the natives, an extensive lagoon, having an area of above 70,000 acres, and receiving the waters of the Selwyn and other small streams ; it communicates during half the year with the sea by a narrow opening : the country consists of extensive plains rising gradually towards the base of the mountains about thirty miles from the coast, drained by numerous rivers, the principal of which is the Cholmondeley or Rakaia, which rises in Mount Kaimatau, distant only about twenty-five miles from the western coast ; in its upper course it forms Lake Coleridge, a considerable sheet of water, and enters the plain at the foot of the snowy range below Mount Hutt, from whence the mountains continue unbroken for about forty

miles to Rowley Peak, from whence a lower range trends to the south and east, and sends out spurs towards the coast which are known as the Cheviot Hills; behind which is an extensive valley, with several lakes drained by the Waitangi River: this has a rapid stream, and reaches the sea "through a labyrinth of gravel banks and small islands;" its lower course is through an extensive plain; and among the hills to the north there is coal. To the south the hills form the coast, which is well wooded, and broken only by the channels of small streams as far as Port Otago, which is formed by a rocky peninsula terminating in Cape Saunders; it is of similar character to those on the north, and is divided into two portions by two islands, the outer harbour being about six and the inner seven miles in length. The isthmus connecting the peninsula with the main land is very low, and probably of recent formation. To the south the valley of the Taieri opens, and grassy downs extend to the Molyneux or Clutha River, also known as the Matou, having a deep but not rapid stream 400 yards in breadth, and accessible for small steamers; in its lower course it has numerous creeks connected with lagunes, and is navigable for large boats probably for more than fifty miles: its upper waters flow through several extensive lakes, of which the most northern, Haiwea, is in the centre of the island, and separated by a mountain range from the lakes of the upper valley of the Waitangi. The largest of these lakes, from which the Clutha flows, is Wanaka, which may be twenty-five miles long, and lies at the base of the main watershed, only twenty-five miles distant from the western coast, and in close proximity to the sources of the Awarua river; the valley of this river is very extensive, fertile, and ten miles north of the mouth, a seam of coal from twelve to twenty feet in thickness, forms part of the cliff. Several considerable rivers flow into the sea to the south of the middle island; of these Jacob's River and New River are important, as forming harbours. Bluff Harbour, on the south-east, is a landlocked basin about five miles in diameter. The south coast is low, but at the south-east indented by numerous irregular and extensive inlets forming excellent harbours; these are known as Port Preservation, Chalky Bay, Dusky Bay, and Breakfast Cove, the two latter being separated by Resolution Island, in which is Facile Bay, perhaps the most important harbour on this coast. The country here is, as might be supposed, mountainous and rugged; for here the southern spurs of the main watershed reach the sea.

Paterson Island is formed by a narrow channel connecting Breakfast Cove with Gaol Harbour to the west, and may be twenty-five miles long; beyond this the coast is rocky and unbroken except by the mouths of small streams and a few small harbours formed by projecting points, of which Milford Haven, False Bay, near the mouth of the Awarua, already noticed, Jackson's Bay, formed by Cascade Point, and Torata Bay, may be mentioned.

Bold Head, in latitude  $43^{\circ}$ , is formed by a spur from the main watershed; and beyond this the mountains recede from the coast, and the rivers become larger; the only important one is, however, Grey River, which, rising in the north near the southern sources of Buller River, receives from the south the confluent stream of the Kotuuraakaoka, which flows from Lake Brunner, and other smaller lakes which occupy a depression between the mountains, affording access to the valley of the Courtenay. This river is only navigable for small craft near its mouth. Buller River, which flows into the sea about ten miles to the east of Cape Foulwind, is formed by two confluent streams flowing from the north-east and south-east, draining narrow valleys among the mountains, each having a course of about fifty miles; the northern draining Lakes Arthur and Howick, lying in narrow mountain valleys; from their confluence to the sea, about twenty miles, the river is only navigable for boats. To the north, the only feature of importance is Wanganui Harbour, which is excellent for small vessels, and presents, like Massacre Bay on the east, available seams of coal.

The Southern Island, called also Stewart's Island and New Leinster, is of triangular shape, its sides respectively forty miles in length; it is undulating, and covered with wood, and culminates in the centre towards the north in a lofty

peak ; it has one small river, the Patterson, falling into Port Somes, which, as well as Ports Adventure, Pegasus, Facile, and Mason, afford good harbourage for shipping. South Cape, the southern extremity of the island, is in latitude  $47^{\circ} 17'$ , longitude  $167^{\circ} 32'$ . The extreme east point of Banks' Peninsula is in latitude  $43^{\circ} 46'$ , longitude  $173^{\circ} 14'$ , and Cape Farewell in latitude  $40^{\circ} 31'$ , longitude  $172^{\circ} 47'$ .

The existence of active volcanoes in these islands has been already noticed ; there are many also of recent but not present action, and much of the surface is of recent volcanic formation. Trap and basaltic rocks are found in abundance, and greenstone and porphyritic formations, one of the lakes in the upper basin of the Clutha being surrounded by rocks of the former ; sandstones are prevalent in the plains. The mineral wealth of the islands is considerable ; coal has been already mentioned as being found in large beds close to the surface, copper and manganese also abound, but the larger portion of the surface is as yet unexplored ; and the forests, remarkable for the varieties and useful qualities of the woods they contain, still cover a large portion. Of the vegetable productions, the phormium tenax, a plant having the same qualities as flax, is, perhaps, the most remarkable. The most characteristic are the ferns, one of which is edible, and the pines, some of which are peculiar. The quadrupeds are all domestic, and introduced by the British settlers ; the native birds are, however, numerous, and some remarkable remains of extinct species have been found ; fish abound in all the waters.

4. *The neighbouring Islands.*—Three small groups are found in closer proximity to New Zealand than any other considerable mass of land, and claim therefore description with it. Of these the Chatham Islands are the most important. This group consists of two islands and several rocks and reefs. Warokauri or Chatham Island, the largest, is square in form, with a deep bight or bay, called Waitangi or Petre Bay, on the western side ; on this side the shore is flat, stretching out in wooded tongues of land ; on the northern, also, it is deeply indented ; the eastern is rocky, and the southern "abrupt and precipitous." The surface of the island is undulating, but not high, the low hills near the shore being covered with wood, the interior chiefly with New Zealand flax and fern ; the island is volcanic, and there are beds of coal or lignite which have been ignited, and remained in a state of combustion. In the interior are several lakes, some of which are connected with a river which enters the sea at Waitangi Bay ; the largest is twenty-five miles long by six broad, it is rather a lagoon than a lake, the water being brackish and influenced by the tide ; there is also much marsh land. This island may be fifty miles in length by fifteen in extreme breadth ; the area has been estimated at 477 square miles. Rangihau or Pitt Island is fourteen miles distant from Chatham Island ; it is only seven miles long by three broad, it is high, and covered with wood. These islands lie between  $44^{\circ} 20'$  and  $43^{\circ} 30'$  south latitude, and  $176^{\circ} 49'$  and  $177^{\circ} 5'$  west longitude. They are 300 miles east of New Zealand.

The Norfolk Island group is smaller, Norfolk Island being about five miles long by two and a half broad ; it culminates in Mount Pitt, at the north-west angle, 1050, or, as some say, 2000 feet above the sea ; the coast is often precipitous, and there is no good harbour, but the island has been described as a "terrestrial paradise ;" its vegetable productions are similar to those of New Zealand, though it has some peculiar to itself. Philip Island, though only one mile and a quarter long, is scarcely less elevated than Norfolk Island ; it is densely covered with timber. Nepean Island is smaller, and has suffered much from earthquakes ; these lie under the twenty-ninth parallel, and the meridian of  $167^{\circ} 47'$  east, and are about 800 miles east of Australia, and 375 north-west of New Zealand.

The Kermadec Islands are also small, the largest, Raoul or Sunday Island, not being more than seven miles long ; it is of triangular shape, lofty, rugged, covered with wood, and of volcanic formation. Matthew Island is also volcanic, and has been in recent action. There are several other small

islands in this group, they lie between  $29^{\circ} 12'$  and  $30^{\circ} 36'$  south latitude, and  $179^{\circ} 15'$  and  $176^{\circ} 47'$  west longitude, and are distant from New Zealand 400 miles to the north and east.

Bounty and Antipodes Islands, insignificant in size, rocky, and sterile, may be named as the only islands known to the south-east of Australia.

## CHAPTER XXXVIII.

### THE ISLANDS OF THE CENTRAL PACIFIC.

§ 1. The southern groups.—2. The western groups.—3. The outlying islands to the north.—  
4. The Sandwich Islands.

**THE Southern Groups.**—The principal islands of the South Pacific lie between the 10th and 23rd parallels, and extend from the 135th meridian west to the 165th of east longitude. On the west they are connected by the Solomon Islands with the Eastern Archipelago, while the Gilbert and Marshall Archipelagos connect the scattered islands to the north of the equator with the Carolines, from whence the Ladrone, Bonin, and other smaller islands stretch due north to Japan. Of the southern groups, the more important are ten in number, including the Marquesas or Mendana, which lie to the north of the 10th parallel. These islands form the extreme north-east limit of the southern groups. They were originally named from the Marquis of Mendoza, viceroy of Peru, but have also obtained the second name from Alvarez de Mendana, who discovered them in 1566: they form two groups, lying between  $7^{\circ} 50'$  and  $10^{\circ} 31'$  south latitude, and  $138^{\circ} 39'$  and  $140^{\circ} 46'$  west longitude. The north-west consists of six, and the south-east of four. These are all similar in character: culminating near the centre the mountains send off spurs towards the coast, forming beautiful valleys, which are usually luxuriantly wooded and remarkable for their fertility. The principal island of the northern group is O-hiva-ua or La Dominica, which is about twenty-two miles long and seven miles broad, and culminates towards the south 4000 feet above the sea. In the northern group, Uapoa or Roapoa is noted for its beauty; but Nuka-hiva is the largest; it is also the most important in the archipelago, affording good harbours, which are wanting elsewhere. Of these Comptroller Bay, and Ports Anna Maria and Tschitschagoff on the south side are the best, the latter being entirely land-locked. This island is seventeen miles long and ten broad, its shores are steep and rugged, but diversified by numerous and beautiful cascades.

To the south of the Marquesas, the low or dangerous archipelago stretches over sixteen degrees of longitude and ten of latitude. The native name, Paamuto, a cloud of islands, well expresses its character; it may, however, be divided into distinct groups, of which eighty or ninety have been enumerated. The principal are Anhar or Chain Island, and the Gambier Islands. They are all of coral formation, many of them lagune islands or atolls, others of dead coral apparently elevated by volcanic action; most are covered with vegetation, but this is rather sparse than luxuriant. Ducie Island is the south-easternmost, it is a lagune island, and rises only twenty-six feet above the sea, and is not perceptible at seven miles distant. It is less than two miles long and about one wide.

Elizabeth and Oeno Islands connect Ducie Island with the Gambier group, which differs from the former in being of volcanic origin; it consists of five large and some smaller islands, encircled by a triangular coral reef. These culminate near the centre in Mount Duff, at the south extremity of Peard Island, the largest in the group; this is about six miles long. The

lagune is accessible by more than one entrance, the depth of water within being about 150 feet, while without the sea has not been fathomed. Mount Duff is in latitude  $23^{\circ} 7'$ , longitude  $134^{\circ} 55'$  west. The well known island of Pitcairn, to the south of Oeno, is also volcanic.

Although uninhabited, the Amphitrite or Actæon Islands may be named. They are three in number, extending about thirteen miles in length, in latitude  $21^{\circ} 23'$ , and longitude  $136^{\circ} 33'$ . Clermont Tonnerre Island is ten miles long and one and a half wide; it is a lagune island, producing cocoa-nut palms, and is inhabited. Scale Island is of similar character. Harpe or Bow Island, so named from its shape, is also a lagune island, and thirty miles long by five broad. There is an entrance to the lagune on the north side. The native name is Heyou or Eaoo. To enumerate others of similar character would be useless, but Anaa or Chain Island, in latitude  $17^{\circ} 23'$ , longitude  $144^{\circ} 36'$ , must not be omitted, on account of its political importance, its inhabitants having had rule over the other islands to the West of Bow Island; it is not large, but very populous. The neighbouring island, Karaka, is remarkable for its pearl fishery, as is Tairo or King's Island, twenty miles further to the north-east. The Palliser Islands consist of three groups of many islands, connected by reefs enclosing an area of considerable extent. Romanzov Island is remarkable as not having any lagune. Vliegen Island, so named from the swarms of flies which greeted the arrival of its discoverers, Schouten and Maire, and named also by Byron, Prince of Wales Island, is sixty miles in length; and an extensive labyrinth of islands and reefs is supposed to exist to the westward, its west point is in latitude  $15^{\circ} 5'$ , longitude  $147^{\circ} 58'$ . Aurora or Metia Island is formed of coral upheaved, presenting a line of cliff 250 feet high, worn into caverns at the base, it has consequently a more varied vegetation than the other islands.

The Society Islands, discovered by Quiros in 1606, and made familiar to all, by Cook's account of his residence there for observation of the transit of Venus in 1769, are eleven in number, the name being now extended to the islands south of Tahiti, which was at first confined to those to the north-west, not indeed including what is now the principal island. This, called by Cook Otaheite, since more usually written Tahiti, is about thirty-two miles long, and formed of two elevated peninsulas, united by a low isthmus only three miles in breadth, the one Tahiti nui, the other Tahiti iti, the greater and the less; these are also named Opouconu, after the great navigator, and Tiarrabu. The northern peninsula culminates in Orohena more than 8000 feet above the sea; from this and other peaks spurs are thrown off to the coast, forming transverse valleys, now so famed for their beauty and fertility. The island is surrounded by a coral reef at a distance of two or three miles, which affords many excellent harbours, of these Matavaï Bay, and Papawa, and Toanoa harbours may be mentioned; but Papiete is the largest and most frequented, this lies at the foot of Orohena, these are in the northern peninsula; the southern is, though mountainous and rocky, even more fertile than the northern, but the most fertile portion is the isthmus. The southern side has several harbourages, but no good harbours. The northern point of this island, where Cook established his observatory, was named Point Venus, and may be estimated to be in latitude  $17^{\circ} 37'$ , and longitude  $149^{\circ} 30'$ .

The easternmost island of the Archipelago, Maitea or Osnaburgh Island, is only seven miles long, but rises 1500 feet out of the sea, it is in latitude  $17^{\circ} 53'$ , longitude  $148^{\circ} 5'$ . Teturoa is a group of coral islets about forty miles north of Tahiti, extending six miles in length. Eimeo is only ten miles from Tahiti, and remarkable for the wild beauty of its scenery, it is volcanic, and, like Tahiti, surrounded by a reef. There are four harbours in this island, the best of which, and one of the best in the South Pacific, is that of Talu on the north side, between two and three miles in length, and surrounded by precipitous rocks, often rising 2000 feet from the water. The mountains on this island exceed 4000 feet in height. Huahine or Vahine, though much smaller,



being little more than eight miles long, is, like Tahiti, formed by two peninsulas, but here the isthmus is overflowed at high water. It has one harbour, named Owharre, in latitude  $16^{\circ} 43'$ , longitude  $151^{\circ} 7'$ . Twenty-one miles to the westward is Raiatea or Uliatea, 130 miles north-west of Tahiti; this, like the others, is mountainous and covered with vegetation, but having more abundant supplies of water; it is also surrounded by its reef, and has several harbours, and two good harbours, one on the east and the other on the north-west side. Tahaa or Otaha is only two miles distant from Raiatea, and encircled by the same reef; it is about one half the size, and is surrounded by numerous islands forming good harbours. Bola-bola is rather more than twelve miles north-west of Tahaa, it is more rugged than the other islands, and the reef which encircles it more irregular in form; it has one good harbour on the west side, which is the most fertile. Tuboi or Motu iti is the most northern group of these islands, and consists of low islets. The northern point is in latitude  $16^{\circ} 11'$ , longitude  $151^{\circ} 48'$ . The most western island is Marua or Maupiti, remarkable for its rugged cliffs of basalt; it is, however, fertile, rising in the centre in well wooded hills, and lies forty miles to the north-west of Raiatea, and is in latitude  $16^{\circ} 26'$ , longitude  $152^{\circ} 12'$ .

The Austral are to the south of the Society Islands, and may be considered a continuation of the chain of Cook's Islands. The volcanic island of Oparo lies off to the south in latitude  $27^{\circ} 37'$ , longitude  $144^{\circ} 15'$ , and is the extremity of a volcanic chain, trending north-west through Cook's Islands and Navigators' Islands; as Pitcairn's Island, is of a similar but not so extensive range, passing through the low archipelago to the Society Islands. Indeed, Easter Island, Sala y Gomez, and even Masafuero and Juan Fernandez, may be considered as connecting the lines of volcanic action in the Pacific with the volcanoes of Chile. Oparo, or Rapa, is only about six miles long, it is mountainous and rugged, and to the south of it other islands have been reported, viz., Bass's Islands, in latitude  $28^{\circ}$ , and Dougherty Island in latitude  $59^{\circ} 20'$ ,  $120^{\circ} 20'$  longitude, which is further separated from other land than any spot on the surface of the globe. Easter Island, known to the natives as Teapy or Waihu, and remarkable for the remains of an extinct race of inhabitants, is of triangular shape, with sides from nine to thirteen miles in length; it is high, and contains the crater of extinct volcanoes, it is fertile, but has no good harbour; it lies in latitude  $27^{\circ} 28'$ , longitude  $109^{\circ} 24'$ . Sala y Gomez lies to the east of Easter Island, under the 105th meridian; it is a rugged and barren rock frequented only by sea fowl.

The Austral or Toubouai Islands are low and comparatively barren; the only one of interest is Vavai, the largest and also the highest in the group; it has a good harbour on the north-west side; it lies to the south-east of the others, under the tropic of Capricorn, in longitude  $147^{\circ} 11'$  east.

Manjaia, the southernmost of Cook's Islands, is about 350 miles distant from Rimitara, the most northern of the Austral Islands, it is of volcanic origin, has no encircling reef, nor any harbourage; is high, but fertile, and is about thirty miles in circumference; it is in latitude  $21^{\circ} 57'$ , longitude  $158^{\circ} 7'$ . Karotonga, an island of about the same size, but more lofty and picturesque, is surrounded by a reef, but has no harbour, and forms with Waiteo and Manjaia, a triangle, the sides of which may be roughly estimated at 100 miles in length. Waiteo is a mere bank of coral, as are Parry's Island and the Hervey Islands to the north-west.

2 *The Western Groups.*—The Samoan or Navigator's Islands are eight in number, the south-easternmost of which is Rose Island, a small low coral reef, in latitude  $14^{\circ} 32'$ , longitude  $168^{\circ} 9'$ . Manua, the Oponu of La Perouse, rises in domelike form, covered with vegetation, to an elevation of 2500 feet; it is well watered, but has no harbour, and may be sixteen miles in circumference. Orosenga and Ofu are small rocky islands; but Lutuila is seventeen miles long and five broad, culminating in the peak of Matafoa, 2300 feet above the sea; it is traversed by ridges of basaltic rock often 300 feet high, above which the luxuriant vegetation reaches to the top of the mountains; it

is remarkable for the excellent harbour of Pago-pago, a circular basin with narrow entrance, surrounded by precipitous rocks. Opolu is the centre island of this group, and thirty-six miles from Lutuila; it is also volcanic, fertile, beautiful, but has only one small harbour. Manono is a small wooded island, only one mile from which is the volcanic basin of Apolima, forming a natural fortress and harbour for boats. Apolima is seven miles from Savai, the most western and largest of the group, being about forty miles in length and twenty in breadth; it is also the most fertile and beautiful, but has only one tolerably safe harbourage, the Bay of Mataatu, off the north point of the island; it culminates near the centre, 4000 feet above the sea.

To the north-west of Navigators' Islands lie numerous small islands and groups stretching to the Gilbert Islands, which lie under the equator.

The Fidjee Fedjee, or more properly Viti Archipelago, is perhaps the most important in the South Pacific, on account of its size and position, as well as from the possession of numerous large and excellent harbours; it was discovered by Tasman in 1643, and has been recently surveyed with care by the Expeditions under Captains Wilkes and Denham. This Archipelago is situated between the fifteenth and twentieth parallels of south latitude and the meridians of 177° east and 178° west, extending about 300 miles in each direction, and consists of 154 islands, sixty-five of which are inhabited, besides numerous reefs and shoals. The island of Viti-levu, or Great Viti, gives name to the group, which is of volcanic formation, fertile, and generally well wooded.

The most important islands are Kambara, which, though only about three miles long, is to be noted for the goodness of its timber, of which the canoes of the natives are made; Vanua-levu, or Sir Charles Middleton's Island, which is about fourteen miles in length and two in breadth, but irregular in form and presenting several harbours; it is the largest of a subordinate group which has been named Wilson's, from its discoverer, and which is surrounded by a reef of triangular shape extending twenty-four miles on each side. Susui, another of the same group, has a beautiful harbour on the north-west side. Batu-bara is also remarkable for its table rock, which, rising from the centre, forms a well-known landmark; Tabu Ouni, or Vuna, for its excellent harbour of Tabou; Vanua Levu, is the second in size of the whole, and has been also known as Sandalwood Island, but that name is no longer applicable; its magnitude is implied in its name "Greatland;" it is ninety-six miles long and twenty-five broad; it has several excellent harbours; Savu Savu is an extensive bay, protected by a reef on the southern side; here are springs having a temperature of 200°, Sandalwood Bay, on the south-west, is, however, esteemed the best, as it is the largest; it is in shape a segment of a circle; six miles across there are others of less importance. This island is fertile and beautiful, rising in many parts 2000 feet above the sea, which appears to be about the average elevation of these islands. Viti-levu is the largest, being eighty miles in length by fifty-five in breadth; it was formerly known as Ambou, a name more properly belonging to a small island at the eastern extremity of Viti-levu. This island is remarkable among those of the Central Pacific for its rivers, the mouths of which are among low marshy land covered with mangrove bushes; the interior, however, rises in mountain peaks 5000 feet above the sea, and thus this island approximates in character to those of the Indian Archipelago; its principal harbour is that of Savu on the south, where also is the good anchorage of Rewa roads. To the west of Viti-levu are numerous groups of mountainous islands surrounded by coral reefs and affording numerous anchorages, among which the harbour of Levuka in the island of Oralau has been preferred to any in this archipelago; this island is seven miles long, and more lofty and picturesque than those around it; it is almost united to that of Matoriki, in which is the extensive Bay of Ambou. Kandabou, the south-westernmost of this archipelago, is remarkable for the truncated conical peak, which rises 2000 feet above the sea at its western

extremity, and for its excellent pine timber. The most western of these islands are the Asaua group, famous for their turtle: they are less fertile than the others, and afford no anchorages of importance.

The Friendly or Tonga Islands lie to the south east of the Viti Islands: the discovery of these islands we owe to Tasman, but our knowledge of them to Cook and his successors. They are more than 100 in number, and lie between  $18^{\circ}$  and  $22^{\circ}$  south latitude, and  $174^{\circ}$  and  $176^{\circ}$  west longitude; the majority are mere banks of coral and sand, some of which have trees on them, and a few rise to some considerable elevation; seven are from five to seven miles in length, but three only are of any size, viz., Tongatabu, Vavao, and Eoa, which are from 15 to 20 miles in length. Pylstaart, the southernmost, lies detached from the others, is 700 feet high, and covered with timber. Tongatabu, best known as a station for the astronomical observations of many voyagers, is the principal southern island; it is very flat, not rising more than sixty feet above the sea; is surrounded by reefs, and remarkable for its fertility and productiveness in roots and fruits; it has one good roadstead on the north, formed by two islands, and called Paughai-motu; it has a lagoon in the centre five miles long and three broad. To the north, in the Namuka or Annamooka group, is the active volcano of Tofoua, rising 2800 feet; to the north-east of which is the conical rock Kao, which rears its head 5000 feet above the sea. Eoa is rocky and comparatively barren. Vavao or Vavau is the principal northern island, it is of small elevation, surrounded by reefs and islets, some of which form Ports Refuge and Valdez, near the west point of the island, the scenery of these is described as beautiful, and much of the island as fertile.

The New Hebrides are what remains of the Australia del Spiritu Sancto of Quiros; they form an extensive and important archipelago lying between  $20^{\circ}$  and  $15^{\circ}$  south latitude and under the  $170^{\text{th}}$  meridian east longitude. Annatom, the southernmost, is about ten miles long by six broad, lofty but not fertile, and has a small harbour on the south-west side. Tanna, the largest to the south, is low, but well wooded and fertile; it has a good harbour, Port Resolution, to the south-east, marked by an active volcano on its west side. Erromanga is high and rocky, but not fertile, producing little but palms and sandalwood; it has no harbour, but Sandwich Island has several, the principal of which is on the west side, which is spacious, easy of access, and well sheltered; the island is fertile and produces fine timber, and may be considered the finest in the archipelago; it is about thirty miles in length. To the northward is Amboyna Island, twenty-one miles in length, lofty, and having active volcanoes, but covered with verdure. Mallicolo is forty-five miles long, remarkable for its fertility and picturesque beauty; it has a harbour at the south-east end three miles long by one broad, easy of access, completely land-locked, and having good anchorage. Leper's Island is also large and fertile; but the largest of the whole group is Espiritu Sancto, which is above sixty miles in length and encircled by numerous islands and reefs; it is mountainous, and the valleys extremely fertile, possesses several good harbours, and is rich in turtle and pearl oyster: it is also remarkable, like Easter Island, for its antiquities.

Banks' Islands lie to the north of the New Hebrides; of these four are of considerable size, the largest may be twenty miles in length: they are lofty and covered with wood, and lie between  $13^{\circ} 16'$  and  $14^{\circ} 10'$  south latitude, and  $167^{\circ}$  and  $168^{\circ} 30'$  east longitude. Farther north still is the Santa Cruz group, of which the southernmost, Vanikoro, or Vanikolo, is noted as the scene of the loss of the ships of La Perouse; this is also known as Recherché Island, and is about ten miles long; it culminates in Mount Kapogo, 3000 feet above the sea, is fertile, and covered with wood; it has harbourages to the north in Tevai Bay; close to which is the island of the same name, and two smaller ones at no great distance. Santa Cruz island to the north is, however, the largest, being twenty miles long, but it is uncertain whether it has any good harbour; it is also known as Uitendi. Tinakoro is a volcanic cone more than 2000 feet

in height, and has been in recent action. These islands are remarkable for their humidity both of soil and climate. Duff's group, or Mendana Islands, lie still farther north, in latitude  $9^{\circ} 27'$ , longitude  $167^{\circ}$ , it consists of eleven islands, the largest of which is not more than three miles long.

New Caledonia connects the islands of the Central Pacific with Australia, as the Solomon Islands do with the Indian Archipelago. This island is remarkable for its triple ranges of mountains, rising more than 3000 feet above the sea, and its extensive reefs, which extend 200 miles beyond its extreme points; it is 200 miles long and about forty miles broad; for the most part barren, but fertile and well wooded in the valleys; in productions it resembles Van Dieman's Land. In the Island of Pines, at the southern extremity of New Caledonia, Victoria Harbour affords security for shipping, as do several bays in Woodin Channel, within the reefs to the south of the island; between it and the Island of Pines the principal is Port St. Vincent, which is accessible to the largest vessels. The coasts of this island to the north-east and south-west are supposed to afford few advantages for shipping, and are very dangerous on account of the reefs and islands which cover them; but on the north-west a good harbour is said to be found near Cape Queen Charlotte.

The Loyalty group, consisting of five principal and several smaller islands, lie to the east of New Caledonia, between latitude  $20^{\circ}$  and  $21^{\circ}$ ; they are of coral formation, well wooded and fertile. The main island is twenty miles long by ten broad, rising 250 feet above the sea, but level, and presenting no harbours. Britannia Island is a lagoon island, thirty miles long. The lagoon is very deep, and accessible to large vessels. This island, known also as Uea or Nungavi, resembles the preceding in character and productions, as does the Island of Lifu or Chabrol, thirty-seven miles long, which lies to the north. The most northern is Halgan or Onca, also known as Hive Island, which forms part of a group enclosing a basin fifteen miles in diameter.

3. *The Outlying Islands to the North.*—Numerous small islands lie to the south of the equator, between the Marquesas Islands and the New Hebrides, none of which are sufficiently important to require description. They are mostly lagoon islands, and none exceed ten miles in length; they form two chains stretching from the Society Islands on the east and Navigators' Islands on the west, crossing the equator in longitude  $155^{\circ}$  east and  $175^{\circ}$  west, the eastern chain trending north-west, stretches as far as latitude  $5^{\circ} 50'$  north, where Palmyra Island, a lagoon island fourteen miles long, is found in longitude  $162^{\circ} 23'$  west. Washington and Fanning's Islands lie to the south-east, and Walker's Island to the east of these, in latitude  $3^{\circ} 34'$ , longitude  $149^{\circ} 15'$ , more than 500 miles distant.

The western range is more important, connecting the Navigators' and Fidjee Islands with Gilbert's Archipelago; the islands of which it consists are all small, of coral formation, and mostly containing lagoons. The only known harbours are in Ellice's group, in latitude  $8^{\circ} 30'$  south, longitude  $179^{\circ} 13'$  east, and at Peyster's group, in latitude  $7^{\circ} 56'$ , longitude  $178^{\circ} 27'$  east. Paanopa, or Ocean Island, differs from the others, being high in the centre.

The Gilbert Archipelago is an extensive range, which may be divided into three separate groups: these have been named Kingsmill, Simpson, and Scarborough, but by some the first of these names is applied to the whole range.

The Kingsmill group lies to the south-east: Arurai, or Hurd's Island, is the most southern, being in latitude  $2^{\circ} 50'$  south, longitude  $177^{\circ} 19'$  east; the largest of the group is Drummond Island, which may be above twenty-five miles in length, there is harbourage, and all the islands are fertile. The Simpson group lies under the equator, it consists of three principal islands, Nanouki or Henderville's, Kuria or Woodle's, and Apamama or Hopper's Island, the latter about ten miles long, the two former each about five. Apamama lagoon forms an excellent harbour. The Scarborough group consists of Taraua or Knox's Island, Marana or Hall's Island, Apia or

Charlotte's, and some smaller islands and reefs; the former is twenty miles in length, it appears to form an extensive bay, the reef to the west being under water. The most northern island is Makin, which is in latitude  $3^{\circ} 20'$  north, longitude  $172^{\circ} 57'$  east.

The Marshall Archipelago is distant from the above-mentioned islands about 150 miles. This is formed by two distinct ranges, the Radack on the east, and the Ralick on the west; the former extends from latitude  $6^{\circ}$  north, longitude  $172^{\circ}$  west, to latitude  $11^{\circ} 48'$  north, longitude  $170^{\circ}$  west; the Ralick, from latitude  $4^{\circ} 39'$  north,  $168^{\circ} 50'$  west, to latitude  $11^{\circ}$  north, longitude  $167^{\circ} 25'$ . The eastern chain consists of several distinct groups, these are named the Melville, on the south, extending for forty miles, the Arrowsmith or Medero for eighteen, Daniel and Pedder Island, Au, Ibbetson or Traversey Islands thirteen miles long, Raven or Calvert Islands thirty, Ezerup twenty-four, Otdia or Romanzov twenty-eight, Legiep nineteen, Ailu fifteen, Tagai twenty-five, besides some detached islands; Bigar or Dawson Island being the most northern. The groups are all Atol Islands disposed in oval rings, mostly affording harbourage, but often inaccessible from the surf. The western chain is of the same character, but not so well known. Bigini or Pescadore Islands are the most northern; the Radolaka or Rimski Korsakof, the largest, being above fifty miles in extent, and the Namou Ode. or Muskillo group about thirty, the Helut twenty, and the Kyli or Bonham Islands thirty, as are the Boston or Covel, the most southern of the group. These islands are often fertile, but their most remarkable characteristic is the small surface exposed in proportion to the area over which they extend: like the Gilbert range, they are probably fast wearing away; both abound in turtle and fish.

The Caroline Archipelago is of the same character, and is said to consist of forty-eight groups, containing from 400 to 500 islands; it has been calculated that their average area is only one German square mile, and their entire length twenty-five German miles; they extend from ten degrees north of the equator. Our knowledge of them is due to Duperrey and Lutké, although probably first discovered by Diego de Roche in 1525. The name by which the Archipelago is known was given to a large island by Francesco Lanzano in 1686. The most eastern of these islands is Ualan, or Strong's Island; this, unlike most of the others, is of volcanic formation, and indeed may perhaps properly be considered as detached from the rest; it is in latitude  $5^{\circ} 21'$ , longitude  $163^{\circ} 6'$  east; like so many in the Pacific, it is surrounded with a coral reef, within which on the east and west sides are two good ports, and on the south a small one; it is very fertile and covered with thick forest, and abounds with rivulets fringed with mangroves; the climate, though humid, is healthy; it rises in numerous peaks, of which Mounts Buache and Crozer rise 2000 feet above the sea. A low isthmus, only two miles and a half broad, separates the eastern and western ports. The McAskill islands form a group of about seven miles in diameter, and Duperrey's group are of about the same extent. The lagunes of both are accessible to large vessels. The Seniavine Islands consist of three separate groups, and lie between latitudes  $6^{\circ} 43'$  and  $7^{\circ} 6'$  north, and longitudes  $158^{\circ}$  and  $158^{\circ} 30'$  east. Among these the largest, most remarkable, and, as has been remarked, the latest discovered of all the Carolines, is named by the natives Painipete, the Pouloupa and Fanope of Duperrey and Kotzebue; it may be nearly twenty miles long, is estimated as fifty miles in circumference, culminating in Monte Santo, 2858 feet above the sea, and remarkable for the basaltic cliff, 1000 feet in perpendicular elevation, which forms its north-west point; it is surrounded by a reef of coral islands, and affords good harbours at the south and north-east ends. This island is remarkable for its fertility and the variety of its productions, in which it resembles but exceeds Ualan. The Andema group lies to the south-west of Painipete, seven miles distant; it is said to be composed of about "a dozen coral islands covered with verdure." The south point is in latitude  $6^{\circ} 43'$  north, longitude  $158^{\circ} 5'$  east. The

Paguenena group, more westerly still, consists of five small islands surrounded by a reef about five miles long by three broad. The Ugaryk group consists of eight small islands, the Nuguore of thirty, of which the largest does not exceed ten miles in circumference. The lagune is twenty miles long and fifteen broad, and remarkable for the abundance of the pearl oyster. It is in latitude  $3^{\circ} 27'$ , and longitude  $155^{\circ} 48'$ . The Mortlock Islands consist of three groups containing ninety islands, one of which, Longounor, at the eastern angle, may be noted for its excellent harbours. The Sotoano group, containing sixty islands, is only seventeen miles in length by twelve in breadth. One of the most extreme groups is that of Hogoleu, which is circular, with a diameter of fifty miles; it may consist of seventy islands, which are very fertile, and afford good harbours. The other groups are of similar character, but smaller; and extending to the north-west, terminate in Yap or Eap, in latitude  $9^{\circ} 30'$ , longitude  $138^{\circ} 30'$ , it has an excellent harbour on the north-east.

The Pellew Islands may be considered the extreme western group of the Central Northern Pacific, they extend for 120 miles from north to south, and fifteen from east to west, under meridian  $134^{\circ} 30'$  east. The largest island is Babelthouap, which is about twenty-seven miles long; it has a high mountain at the northern extremity, and is in latitude  $7^{\circ} 40'$ . These are best known as the birthplace of Prince le Boo.

The Mariana or Ladrone Islands extend from north to south for 420 miles. Of these the most important is Guahan or Guam, the most southern; it is about twenty-nine miles long and three broad; the shore is steep on the east, but shelving on the west; it is fertile in roots, fruits, and the cocoa palm, it affords good harbourage in several places; the south-east point is in latitude  $13^{\circ} 14'$ , longitude  $144^{\circ} 86'$ . Most of these islands are of volcanic formation; Saypan is distinguished by its peak rising 2000 feet above the sea; Tinian, which nearly joins it for its fertility; the islands form together a sheltered roadstead; Guguan also culminates at 2000 feet, and has an extensive crater in recent action on the north side; Grigan Island rises to even greater elevation; Ascunciao is a volcanic cone, but less elevated; Guy Rock, in latitude  $20^{\circ} 30'$ , longitude  $145^{\circ} 32'$ , is the most northern of this archipelago.

The Bonin or Arzobispo Islands were discovered by an English vessel in 1825. We owe our knowledge of these to Beechey, Lutkó, Perry, and Qvin; they are well wooded and fertile, and consist of three clusters, lying between  $26^{\circ} 30'$  and  $27^{\circ} 44'$  north latitude. The principal is Peel Island, in which is a good harbour called Port Lloyd, of which formal possession was taken by Capt. Beechey, in 1827.

Some islands are reported between the Bonin Islands and Japan, and there are detached rocks and shoals to the east, extending across the Pacific.

4 *The Sandwich Islands*.—Of the outlying groups this is by far the most important, if it be not more important than any in the Central Pacific. They were probably known to the Spaniards, but that knowledge was lost, and we are indebted to our own great navigator Cook for their discovery. The archipelago consists of thirteen islands, extending from latitude  $18^{\circ} 54'$ , longitude  $155^{\circ} 30'$ , to latitude  $23^{\circ} 34'$ , longitude  $164^{\circ} 47'$ ; the largest, the south-eastern Hawai, the Owhyhee of Cook, is triangular in shape, the west side being 100, the north-east eighty-four, and the south-east sixty-four miles in length: it is one mass of comparatively recent volcanic formation, rising in three principal mountains, Kea on the north-east, Huakali on the north-west, and Loa on the south.

Mauna Kea is not so apparently an active volcano as the others, but it is the most lofty, being 13,953 feet above the level of the sea, rising in one great mound covered with forests to within 1000 feet of the top, which divides into nine cones. Mauna Huahali or Huarari, written Wororay by Vancouver, is only 7822 feet in height, its sides are covered by numerous cones and craters, and its summit forms one of great extent. Mauna Loa rises like a flattened dome to the height of 13,760 feet above the sea; there is an extensive crater

in active operation at the summit ; on its side, 3970 feet above the sea, is the volcano of Kilanea, a crater three miles and a half long and two and a half wide, in which lava is in a constant state of ebullition ; from it an eruption took place in 1840, and recent accounts (1856) speak of another fearfully destructive. The northern and especially the eastern portions of the island are very fertile, the southern rugged and barren, formed by the volcanic débris ; a portion of the north-west coast is also rocky. Hilo Waiakia or Byron Bay is the only harbourage on the east side of the island ; it is extensive, and considered by Wilkes to be safe throughout the year, it receives the waters of Wailuku River, and the country is covered with luxuriant vegetation. At the north-west extremity is Towaihai or King's Bay, this is the principal harbour in the island, and the district surrounding it was famous for its sandalwood. Kailau and Karakakooa Bays, the latter familiar as the scene of the death of Captain Cook, are also on the west side, which being the leeward side, and therefore deficient in moisture, is not so fertile as the eastern.

Maui, the Mowee of Cook, is formed of two peninsulas, connected by a low isthmus only nine miles wide. Two volcanoes rise one at each extremity, that on East Maui, the largest peninsula, rising in one continuous slope 10,000 feet above the level of the sea, covered with extinct craters and volcanic débris. West Maui is broken into several peaks, the highest of which is 6130 feet, forming deep valleys extending in fertile plains ; the limit of the woods is 6500 feet above the sea. The isthmus is about fifteen miles in extent, sandy, but affording food for cattle during nine months of the year ; this island has no harbour. The island, Kahoolawe, fourteen miles long, lies to the south-west of Maui, and appears to have been once connected with it ; Lanai, about the same size, is twenty miles further north-west, and beyond is Molokai, which, though forty miles long by nine broad, is for the most part mountainous and barren. Oahu, the next island, is somewhat larger, being of the same length as Molokai, and twenty miles broad, this is the most important in a commercial point of view, on account of its harbour of Honolulu, the best in the whole archipelago. To the south this island is like Hawaii, rocky, barren, and unpromising, but the greater part is eminently fertile and productive ; the eastern side is remarkable for the beauty of its scenery, rising in bold precipices 3000 feet in height, broken by waterfalls and covered with verdure ; the western is steep and often craggy, except towards the south, where a fertile district stretches for twenty miles about. Opooroah or Pearl Lagune, so named from the pearl oyster being found there. This extensive basin is landlocked save at one entrance, where there is only fifteen feet of water, but within the depth is sufficient for ships of any size, and the space for any number. The harbour of Honolulu is good, but the surrounding country wanting in the appearance of fertility ; its most characteristic feature is the extinct volcanic cone, Lialu or Diamond Hill, so named from the crystals which are found in the crater. About ten miles to the east of Honolulu is Waikiki, remarkable for its salt-pits. The northern side of the island is the most fertile.

Kauai, or Atooi, is 100 miles from Oahu ; it is twenty-eight miles long and twenty broad ; the north and west sides are rugged, but from the south the island rises regularly to its culminating point, Wailioli, 6000 feet above the sea. This island is very fertile, and Warinea Bay on the south side affords good anchorage, as does Halalai Bay on the north side.

Uihau, or Oueeow, is sixteen miles to the south-west of Kauai ; it is eighteen miles long and eight broad ; it is only remarkable for its yams and fruits. Kaula, fifteen miles south-east of Uihau, a small rocky island ; Bird Island, above 100 miles to the north-west, and Nicker Island, nearly 200 miles to the westward, complete the number. The importance of this archipelago is not consequent on the fertility of its soil, the salubrity of its climate, or the number and variety of its productions, but on its position. Situated within the trade winds, the distance from it being to San Francisco, California, 2083, Juan de Fuca Strait 2292, Tahiti 2379, Acapulco 3285, Petropaulowski 2745,

Japan 3853, Shanghai 4301, Auckland, New Zealand 3817, and to Lima 5160 miles respectively, thus being naturally the centre of the trade of the North Pacific.

## CHAPTER XXXIX.

### THE EASTERN COAST OF THE SOUTH PACIFIC.

§ 1. The coast of Patagonia.—2. Terra del Fuego.—3. Western Patagonia.—4. Chiloe.—5. The northern coast.—6. The islands.

**THE Coast of Patagonia.**—The Strait of Magelhaens, separating Terra del Fuego from Patagonia, forms an irregular triangle, having its apex towards the south, and extending north-east and north-west for about 150 miles. Its southern point, Cape Froward, a bold headland with a round hill above it, is in lat.  $53^{\circ} 53' S.$ , long.  $71^{\circ} 18' N.$ , and marked by several rocky peaks of considerable elevation; Mount Tarn, on the east, rising 2600, and Nodalis Peak about 2500 feet above the sea.

From the eastern extremity, Cape Virgin, in lat.  $52^{\circ} 20' S.$ , long.  $68^{\circ} 21' W.$ , two wide reaches extend, separated by a narrow strait; here the shores are low, and the outlines of the coast regular; a second strait, but not so narrow, leads to another expansion, varied by islands and shoals, and deep indentations of the coast. Lu Bay and Gente Grande Bay are on the south, and Packet Harbour and Oazy Bay—the former good, the latter inferior—on the north, while on the same coast Elizabeth Island covers a roadstead about seven miles long; and here, at Shoal Haven, the coast is low, and the country covered with lagunes, and the great sheet of Otway Water approaches closely to the sea. Below this point, the strait spreads to the width of fifteen miles, trending nearly south for fifty miles, Useless Bay spreading wide into the land on the east, and Admiralty Sound stretching deeply towards the south-east; from these the main channel is separated by Dawson's Island. Here, under Mount St. Philip, 1300 feet high, is Port Famine, well-known in the history of this region; it is well sheltered, and by no means destitute of resources, yet altogether unfitted for a colony of Europeans, such as Sarmiento endeavoured to place there, whose miserable end caused it to be so named.

Port Famine is about thirty miles distant from Cape Froward on the east, as Port Gallant is to the west; this has been described as a perfect wet dock: the strait is here about five miles wide, and broken by islands; the north coast, low, regular; the southern, lofty, broken, and indented. From hence, the strait narrows to less than two miles, and having for fifty miles an average breadth of about three; and here the Gulf of Xualtega stretches eastward for twenty-five miles, with an extreme breadth of ten, and approaching closely Jerome Channel, which trending north-west for ten miles, and north-east for ten more, its shores deeply indented with bays and fiords, opens on Otway Water, which extends forty-five miles to the north-east, and gradually expands to fifteen miles in breadth; its southern shores are broken by numerous bays, the northern are more regular; Inglefield and Vivian, with two smaller islands, form a group about ten miles from Point Stokes at the south-west entrance.

Fitzroy Passage, irregular and narrow, not exceeding one mile in width, and trending north and north-west, leads from Otway Water to Skyring Water, of more irregular form, exceeding sixty miles in length from east to west, but with only an average breadth of ten miles; to the east, the shores are comparatively low and unbroken, but proceeding westwards, high ranges of hills on the north, and on the south, mountains 3000 feet high, with glaciers descending to the water's edge, vary its outline; here also are many islands, of which Dynevor Castle, the largest and most easterly but one, occupies



the centre of the water. There is no outlet known to these waters to the east, west, or north, although they approach within about two miles of arms of the sea in each direction. From the Gulf of Xualtegua to Cape Tamar, the western extremity of the south coast of Patagonia, in lat.  $53^{\circ} 55' S.$ , long.  $73^{\circ} 48' N.$ , the coast is high and bold; Tamar Island lies to the west of the Cape, and there is a secure cove on the east side. The two peninsulas formed by Otway and Skyring Water, and the fiords to the north-west, are named respectively Brunswick and King William Lands.

2 *Terra del Fuego*.—This Archipelago, so named from its numerous and active volcanoes, consists of several large and a multitude of small islands, extending between the 66th and 75th meridian of west longitude, and having its southern extremity, Cape Horn, in lat.  $55^{\circ} 59' S.$ , long.  $67^{\circ} 16' W.$

The largest mass of land in Terra del Fuego appears to be the King Charles Southland of Narborough, known as Eastern Terra del Fuego, and which is supposed to extend from the Strait of Magellaens to Beagle Channel,—*i.e.*, about 150 miles from north to south,—and from Cockburn Channel on the west, to the Strait of Le Maire on the east, which is more than 200. The northern and eastern portions are low, and the centre low and marshy, and there may be divisions at present unknown to us. The southern and western portions, or Terra del Fuego Proper, consist of a rugged range of mountains, from 3000 to 4000 feet in general elevation, and culminating in Mount Sarmiento, a snowy peak, 6800 feet above the sea, and which can be seen from Elizabeth Island, already mentioned, thirty-two leagues to the north; there are other peaks of nearly as great elevation, Mount Darwin, to the east, attaining to 6600 feet. All these mountains are snow-covered, and vast glaciers descend from their sides, but many of the valleys and coves are well-wooded and fertile, and the country about them of much picturesqueness of character, the eastern slopes of the hills being generally covered with wood. Navarin and Hoste Islands are separated from Terra del Fuego Proper by Beagle Channel.

To the east of false Cape Horn, in lat.  $55^{\circ} 43' S.$ , long.  $68^{\circ} 6' W.$ , the southern extremity of Hoste Island, is a group of islands, of which Wollaston Island is the larger, and Horn Island the most noted, its southern extremity being Cape Horn. Staten Island, presenting a singularly irregular outline, and several secure harbours, is separated by the Strait of Le Maire from Terra del Fuego, which was so named from the Dutch navigator who discovered it in 1616, and is about twelve miles wide. The island is about thirty-five miles long by five in extreme width. Cape St. Diego is the western limit of the strait on the north.

Gordon Island and Londonderry Island form Darwin Sound, and from the latter numerous small islands stretch to the north-west, on the north of the western extension of Terra del Fuego Proper, separate the Strait of Magellaens from Admiralty Sound, St. Gabriel, Magdalen, and Cockburn Channels; while Barbara Channel separates Clarence Island from the great western mass of Terra del Fuego, the Land of Desolation of Narborough: this extending for above 120 miles in a north-west direction, is no doubt an extensive archipelago, of which the better known groups to the south and west are outliers, and form Stokes Bay, Breaker Bay, and Otway Bay, which, indeed, are rather sounds than bays. The Land of Desolation terminates in Cape Pillar, in lat.  $52^{\circ} 43' S.$ , long.  $74^{\circ} 43' W.$ , the western limit of the Strait of Magellaens.

3 *Western Patagonia* extends from Beaufort Bay, to the north of Cape Tamar, to the Gulf of Penas—*i.e.*, over five degrees of latitude; its entire coast is covered by an archipelago, and deeply indented by fiords. The most remarkable of the latter is the most southern, the Ancon-sin-salida, which, extending thirty miles inland, ramifies deeply to the north and south; on the latter, one arm, Destruction Sound, approaches closely to Skyring Water. Among the islands the largest appears to be the most northern, called Wellington Island, which yet may prove to be divided, and is separated from the main by Mesier Channel, the distinguishing character of which is that the shores

are hilly but not high, the low land being generally thickly-wooded with trees of small size; it is about 150 miles long by three miles wide. The western termination of the channel is in the Guaianeco Islands, which are rocky, and partially wooded. Two of these, Byron and Wager Islands, are larger than the others; and in the passage between them is Speedwell Bay, a spacious and secure harbour.

The outer coast of Wellington Island, or archipelago, is much broken, and covered by smaller islands. The Gulf of Trinidad, in latitude 50°, separates it from that of Madre de Dios, which again is separated from Hanover Island, or archipelago, by Conception Strait, and this again from Queen Adelaide Archipelago by Lord Nelson Strait. These are all rocky and barren to the west, which, as a lee shore, is dangerous, though there are numerous excellent harbours. Through the channels which separate the islands, vessels of any size may for the most part pass safely. The most marked feature of the coast is the Cape Tres Puntas of Sarmiento, which rises 2000 feet above the sea; and here, at Port Henry, is an admirable land-locked harbour, called Aid Basin, capable of containing a large fleet: a spacious harbour is also found to the north of Cape Corso, on the opposite side of the Gulf of Trinidad; and Port St. Barbara, at the northern extremity of Campana Island, is to be noted for its safety and for the picturesque beauty of the hills which surround it, covered with flowering shrubs.

The mountains along this coast rise 2000 feet above the sea; "rocky islets, rocks, and breakers" lie off shore for two or three miles, over which the surf beats heavily.

The Gulf of Penas extends for about forty-five miles from the Guaianeco Islands to the peninsula Tres Montes, a bold promontory rising 2000 feet above the sea, but not appearing in threefold division. The outline here is less rugged, and the country better wooded than to the south. Port Otway, about fifteen miles from the Cape, within the Gulf, is perhaps one of the best harbours on this coast, being safe, and affording timber for spars, as well as water. The Gulf of St. Estevan is also to be noted, extending to St. Quentin's Sound, which is ten miles deep, the shores low, and covered well with grown timber. Kelly Harbour, remarkable for its glacier, Jesuits' Sound, and Channel's Mouth, are fiords stretching from the Gulf of Penas to the east and south. The coast northward of Cape Tres Montes is remarkable for its bold outline and thick covering of forest, and varies from 2000 to 4000 feet in height; it extends for about seventy-five miles to Cape Taytao, or Taytao-haohuon, from which rises a peak 3000 feet in height, surrounded by "a wilderness of rocky, granitic mountains;" numerous islands lie off to the north and east, and connect it with the Chonos Archipelago, which is formed by numerous small islands, lying very close together. They are lofty, and some of the islands around them rise 3000 feet above the sea; but Huafu, near the northern coast, is comparatively low and thickly wooded, and does not exceed 800 feet in height. There are numerous safe harbours among these islands. From them the Cordillera of the Andes is visible.

4 *Chiloe*.—The island of Chiloe is about 100 miles in length and forty in breadth; is hilly, but not mountainous, and well wooded. Sixty-three smaller islands to the east complete the archipelago, which is separated by the Gulf of Ancud from the main land, a narrow slip at the base of the Cordillera. The gulf side of the Island of Chiloe, as well as the archipelago, has a drier climate than the seaward, and is also better provided with harbours. Cucao Bay may, however, be noted here. The wooded tableland has an elevation of from 2000 to 3000 feet. The port of San Carlos to the north of the island, is now the most important, and is much frequented by whale ships; its harbour is excellent, as is also that of Chacao, the first settlement of the Spaniards at the north-east extremity of the island; here the narrow channel which separates Chiloe from the main does not much exceed one mile at its narrowest part.

The western coast of Chiloe is comparatively unbroken; the eastern

deeply indented, and covered with islands. Cancabue Island covers an extensive roadstead, in which the land-locked basin, Oscuro, or Huyter Cove, offers great facilities for the repair of ships. Quinched, Quehuy, and Lemuy Islands, cover the bay and inlet of Castro. The eastern side of the inlet is about 150 feet in height, and covered with wood; the west rises in terraces to about 500 feet, behind which the wooded hills buttress up a tableland 1000 feet in elevation. Tranque Island covers Campu Inlet, and Houldad Inlet may be mentioned to the south; as well as a deep bay, covered by the islands Caylen and Laytee, about the same size, but one semicircular in form, the other about twelve miles long, and divided by a strait two miles wide. Colita Island, near the shore of Chiloe, is low and thickly wooded. Huamblin Island, at the south-east extremity of Chiloe, from which it is separated by a very narrow channel, rises in two peaks, covered with wood, the westernmost of which culminates 3200 feet above the sea. Huape, or Quilan, a small island, lies to the south of the Cape of the same name, which forms the south-west extremity of Chiloe. It is 300 feet high, rounded, woody, and remarkable for the yellow cliffs near to it.

Chiloe is covered, with the exception of the cultivated portions on its eastern coast, with continuous forest; of its interior nothing is known; the only remarkable feature beyond the coast line, with which we are acquainted, being Cucao Lake, on the west side, of irregular form, and about ten miles long.

The Chaugues Islands form an irregular group between Chiloe and the main, nearer to which lie those of Chulin, Talcan, and others.

The western coast of Patagonia lies at the base of the Cordillera, which rise, covered with wood, to a height of 4000 feet, and with snow above. From Melemoyu, the Trident Mount of Fitzroy, which he estimated at 7500 feet, and which lies nearly under the 44th parallel, Yantiles Mountain, which is above 8000, the Volcano of Corcovado, 7500, Minchinmadeva, 8000, and other lofty peaks, point northwards to the Volcano of Osorno, or Purrraque, which, with its remarkable cone, 6000 feet in height, is the landmark of the country, and attains an elevation of 17,550 feet above the sea. About the base of this volcano are several lakes—those of Ilanquihue and Nahuelhuapi, are large; but of them little is known. The river Puella issues from the latter, and falls into Reloncavi Inlet, which again unites with the sound of the same name, extending inland for twenty miles, and ten miles in width. Around it are several lakes, and it has two islands within it, and two at its mouth, which narrow the entrance to about two miles. Of the coast from this point to the Peninsula Tres Montes, but little is known.

5. *The Northern Coast.*—From the volcano of Osorno the Chilean Andes rapidly increase in elevation; Villarica, under parallel 39, being 16,000, and Aconcagua, under the 32nd, 23,200 feet above the sea; they also recede from the coast, from which, in latitude 37°, their peaks are 150 miles distant.

Chocoy Head, the southern extremity of the Chilean coast, is opposite San Carlos; at the entrance of the Narrows of Chacao some rocks and islets mark it to seaward, and to the north, Maullin Inlet stretches deep into the land; from hence, however, the coast is unbroken, and formed of hills rising 2000 and 2500 feet from the sea, affording no harbourage for ships till Valdivia Harbour, the entrance of which is to the north of the 40th parallel. Several small rivers empty themselves into this harbour; the Calla Calla, on which is the present town of the same name, the Tolten, Cauten, and others. The headlands and islands rise 300 feet, and the country, everywhere well wooded, is for the most part 1000 feet above the sea, forming a barrier between it and the llanos which stretch to the base of the Andes.

Mocha Island, about seven miles long and three broad, in lat. 38° 23' S., long. 73° 59' W., is remarkable as the only island off this coast, from which it is distant twenty-five miles; it is abrupt towards the south, and culminates

1250 feet above the sea, sloping gradually to the north; it lies about half-way between Valdivia and Concepcion. None of the rivers on this beautiful and fertile coast are navigable now, though some were formerly, and especially the Tubul. The coast, excepting near the mouths of the rivers, is high, steep, and well wooded, the water deep; towards Tucapel Head it is wild and rugged.

Arauco Bay is formed by a deep bend of the coast, marked by the small rocky island Santa Maria, about thirty miles to the south-west of the entrance of the Bay of Concepcion, which is the finest on this coast, being six miles deep and four miles wide, with good anchorage and well sheltered. Tumbes Point and Loberia Head mark the entrance, and five miles from the latter to the east, Mount Neuque, though the highest land in the neighbourhood, rises only 1790 feet above the sea. The coast here rises above 500 feet, excepting near the mouth of the River Maule, which, though the outlet of a most fertile country, has a bar at the mouth, preventing the entrance of shipping. In this latitude is the easiest passage across the Cordillera. The projection of Point Angeles or Branca, forms the Bay of Valparaiso, nearly under the 33rd parallel; the land here is rugged and rocky, rising abruptly behind the bay from 800 to 2000 feet, and the Nevada of Aconcagua towers in the distance above the Cordillera. This bay is open to the destructive effect of the "Northers" which prevail in the winter, and is moreover said to be rapidly filling up.

To the north of Valparaiso the coast becomes more rugged and barren, presenting regular lofty blue cliffs 150 feet high, above which the land rises for 300 feet, backed by a range of mountains from 3000 to 4000 feet in height, about three miles further inland.

Coquimba, or La Serena, is the next marked indentation of the coast, though to the south of the southern point which forms its entrance, the small but secure harbour of the Herradura de Coquimba is found: here the coast range attains in Cobre Hill an altitude of 6400 feet; beyond this Chanaral Bay opens on a valley, which, though the most fertile on the coast, did not afford pasturage for the horses of Mr. Darwin's party: yet the abundance of copper in this district, otherwise so unproductive, should give it an important export trade. The whole of this country has been subject to many elevations, as may be seen in the parallel raised beaches of Coquimba and Guasco.

The Herradura of Carisal to the north of Lobos Point, may be noticed as offering security to vessels which Copiapo to the northward does not, though covered by Isla Grande; here at one time a large river must have debouched, but probably few countries have had their natural features so altered by earthquakes as this; yet here there are no volcanoes, and the range of the Cordillera does not often exceed the limit of perpetual snow, the rivers maintaining nearly an equal quantity of water throughout the year.

It has been already observed (pp. 436-8), that transverse and parallel ranges are only found on the east side of the line of watershed of South America, which for the most part lies near the coast, the only navigable river in the central part being the Piura, which has only a length of about 120 miles. North of Coquimba, Constitution Road may be mentioned under Mount Moreno, so named from its brown colour, which rises, barren and rugged, 4160 feet from the sea; the anchorage is covered by Forsyth Island. The headlands on this coast are bluff and lofty, rising 1000 feet, and sometimes covered with guano, giving them a chalky appearance.

Cobija Bay may be mentioned as occasionally resorted to for copper ore, but on this desert coast harbours are rare because they are not required; to Cobija and Iquique, a small port to the north, among barren sand-hills, all necessaries are brought by sea; to the latter, even water from the Pisagua, 40 miles distant. The sand-hills of Iquique are surrounded by a wall of rocks 2000 feet high, which are continued along the coast; from hence abundance of saltpetre is exported, and here silver was abundant. About the River

Pisagua the cliffs are lower, but to the north rise again in regular line, broken only by two deep gullies. At Arica the coast is again low, and continues so along the plain of Arica, which rises gently from the sea to a plateau, with scattered trees. Between Cobija and Arica the marked features of the country are the Nevadas of Schama or Gualatieri, Chungara and Parmiacota, known as the Twins (Nuclizzos), and the ragged ridge of Anacalache; to the river Juan de Dios or Juan Diaz, the coast is low and sandy, but rises again forty-five miles from Arica in the Morro de Sama, 3890 feet above the sea, thirty-one miles from which is Coles Point, a low sandy spit, having the anchorage of Ylo within it. From Arica the coast trends north-west to this point, and continues in that direction more or less to Cape Blanco; under the fifth parallel from Ylo the coast is rocky, the cliffs from 300 to 400 feet high. The old port of Mollendo is now silted up, but the Bay of Ilay affords good anchorage; and here the most remarkable feature of the coast is the white ashes which cover the basis of the hills: here also, fifty miles inland, rise the nevadas of Picupicu, Arepiqua, and Chacani, the second, giving name to the second city in Peru, is a truncated cone 18,300 feet high, the others form serrated ridges.

The country on this coast opens in fertile valleys; of these, Tamba and Camana are remarkable; these have trees, but the mountains and coast are rocky and barren. Two deep bays, covered by islands, are found here, Yndependencia Bay and Pisco, the former offering little but secure harbourage, the latter, known from the abundance of guano afforded by the Chilca Islands. These, though they present only seven square miles of surface, are said to have a supply exceeding 50,000 tons for 1000 years. They are granite rocks, and the guano in the centre of the most northern 100 feet deep. Here no rain ever falls, and hence the deposit remains. Beyond the Chilca Islands the country opens in the valley of Lurin, off which are the Pachacamac Islands, so called from a Peruvian temple, the remains of which still exist on the summit of St. Francisco, the largest of them, which was formerly connected with the mainland by an isthmus; sandy beaches here characterize the coast.

The Bay of Callao, covered by the island San Lorenzo, which rises in three points, the northern culminating 1284 feet above the sea, is four miles and a half long and one broad; the island is composed of limestone, clay, and slate, and has afforded remarkable evidence both of the rising and depression of this part of the coast. Here the Cordillera is, from sixty to seventy miles from the coast, unbroken, and the passes over it above 15,000 feet in elevation. Callao is the principal port on this coast, which here is comparatively low, with bluffs and shingly beaches. Off Salinas Point are the rocky islets called Huaras. The Bay of Salinas is large, and affords good anchorage. The Bay of Huacho is marked by the three double peaks of the Beaver Mountains, and beyond it the coast is moderately high with a sandy outline, afterwards rising in clay and rocky cliffs. Guarmey is a tolerable harbour. The coast is here marked by the Cerro Mongon, which is said to enclose a fertile, well watered valley: but the best harbour on the coast is the Bay of Samanco; it is six miles long and three wide, and two across at the mouth, and very superior to that of Ferrol to the north, which is better known. The small islands, Lobos de Tierra and Lobos Afuera, are frequented by the natives of the coast for fishing.

The port of Payta, marked by the hill or saddle of Payta, with its three peaks, is excellent, and much frequented; the coast is here low and sandy, but rises again at Parnia Point, twenty-four miles to the north; the line of coast hills culminates here in Amatape, which rises nearly 4000 feet above the sea. Cape Blanco, in latitude  $4^{\circ} 17' S.$ , longitude  $81^{\circ} 16' W.$ , is high and bold, and from hence the coast has a north-easterly trending to the head of the Bay of Guayaquil, and about seventy-five miles from it is the mouth of the River Tumbes, where Pizarro landed for the conquest of Peru, but which offers no facilities now for such a purpose.

The estuary of Guayaquil is very extensive, but much embarrassed by shoals; it receives the Guayaquil and Daule rivers; the former is the most important to commerce on the west coast of South America; it is, however, narrow (not exceeding one mile and a half wide), and muddy, though rapid; its banks lined with mangroves and swarming with alligators. The islands of Puna and St. Clara lie within the estuary, and the entrance of the river at Point St. Elena is sixty-eight miles from the latter. Selange and La Plata Islands lie on this part of the coast, the latter noted as the resort of the Buccaneers, and so named by Drake; it is bounded by high cliffs, flat, and wooded at the top. The sugar-loaf cone above Manta marks this part of the coast, beyond which Caraccas Bay, noted for the beauty of its scenery and the richness of the soil about its river, opens.

From Cape Passado, a bluff projection from a well-wooded mountainous country to Cape St. Francisco, a distance of about fifty miles, the coast line is varied by many projecting low points, and beyond this several rivers fall into the sea; the Esmeralda, Tumaco, and St. Jago, all of which are said to be navigable; here the coast is low and full of creeks. The islands of Gallo and Gorgona lie off this coast, the latter is five miles long, covered with trees, well watered and fertile, and rising 1296 feet above the sea; rain is said to fall here daily, but without doubt, the contrast between the humidity of this portion and the dryness of the central portion of the west coast of South America is very great.

Buenaventura Bay affords every facility for becoming one of the most important commercial ports on the Pacific; its harbour is of considerable extent and sufficient depth; the rivers Dayna and Chiuquiquira, navigable for boats, fall into it. To the north is the Bay of Tipica or Cupica; this is said to be a good harbour, and the country round it is hilly and well wooded.

6 *The Islands.*—The islands off the west coast of South America are few and far between: on the south, Juan Fernandez and Massafuero, St. Felix and St. Ambrose; on the north the more important group of the Galapagos, and the little detached island of Malpelo off the Gulf of Buenaventura.

Juan Fernandez, also called Massa Tierra, has been often described, and is well known as the scene of Defoe's romance. At a distance the mountain Yunque, or the Anvil, rises 3000 feet above the sea from a precipitous range, the shore being formed by a wall of rock 800 or 900 feet high, broken by wild ravines, through which rush mountain torrents; within are verdant glades surrounded by luxuriant woods; in the upper parts are extensive grassy plains, fringed with dark myrtle bushes. The Yunque is wooded nearly to the summit; from its base an extensive valley opens to the shore, through which flow two streams. French, Cumberland, and English Bays—the second of which is the best, but even that is open to northerly winds—offer some shelter and supplies to shipping; sandal wood is said still to be found there, and the hills abound with goats, from which the neighbouring rocky island, St. Clara, is sometimes also named: Juan Fernandez is about twelve miles long by six broad.

Massafuero, or Massa e fuera, is smaller, and lies in lat.  $33^{\circ} 49' S.$ , long.  $80^{\circ} 56' W.$  This island is rocky, but well wooded and fertile, and culminates 2300 feet above the sea; it is about five miles distant from Juan Fernandez. The Spanish fort, Juan Baptista, on Juan Fernandez, is in lat.  $33^{\circ} 37' S.$ , long.  $78^{\circ} 63' W.$  St. Ambrose and St. Felix are small rocky islands lying near the intersection of the southern parallel 26, with the meridian 80th west, about 450 miles from Copiapo; they offer no shelter, but are resorted to for fishing and for water; the former about five miles in circumference, and rising 1600 feet above the sea; the latter, a group of five rocky islets, presenting the appearance of hummocks covered with sand, but having steep and rugged shores; these are about ten miles distant from St. Ambrose.

Of the islands off the coast of South America, the Galapagos are by far the most important, not only from their size and productions, but from their

position, lying under the intersection of the Equator and the 90th meridian W from Greenwich, they are in the direct track not only of vessels from Panama to the islands of the Pacific, New Zealand, and Australia, but have, notwithstanding their position, from the influence of the great ocean, and their distance from land (about 550 miles), a climate sufficiently mild for the production of many of the vegetables and fruits of temperate regions; and although the northern slopes are comparatively barren, the southern slopes, from the constant precipitation resulting from the regular southern breezes which bring to them the water of the Pacific, are verdant and productive throughout the year. Cattle thrive on their natural produce throughout the year, fish abound in the seas, and they afford one of the best whaling stations in the Pacific. They are named from the large terrapin or land tortoise with which they still abound; are of volcanic formation, and bear tokens of recent action: Captain Morrell gives accounts of terrible irruptions in Narborough Island in 1825; among them are excellent roadsteads; indeed, from the constancy of the southerly winds, the northern or lee sides are almost always safe, as the southern would be during a "norther," if such should by chance blow home. Coal is reported by Dr. Coulter on Chatham Island, but the geological structure of the islands renders its existence improbable.

This group consists of six principal and nine smaller islands, with numerous islets and rocks; the largest is Albemarle Island, the two portions of which form an extensive bay, in which lies the smaller island of Narborough; this is called Elizabeth Bay; and both are formed by the elevation of volcanic cones, of which, on Albemarle Island, there are six, rising from 2000 to 4600 feet above the sea, and broken by huge craters; off the south-east point, which is low, lie four small islands, the remains of volcanoes. The south-west cape, Port Essex, is high, and Narborough Island is supposed to be the highest land in the group. Tagus Cove, the remains of an extinct crater, and affording good anchorage, lies in the strait between the two islands.

Albemarle Island is, like so many other islands of the Pacific, formed of two parts, united by a narrow isthmus, called Perry Isthmus, about five miles and a half broad; the extreme length of the island is about seventy miles, and its greatest breadth at the south forty-five; the two portions lie at right angles the northern measuring fifty miles by ten, the southern forty-five by twenty. Narborough Island is quadrangular, and fifteen miles in diameter. The northern points of Albemarle Island are Capes Berkeley and Albemarle, distant seventeen miles; from both of which, at the distance of fifteen miles, a high barren rock, called Redondo, rises out of the deep water.

The most northerly of the group is Culpepper's Island, in latitude  $1^{\circ} 2'$  north; this, like Wenman's Island to the south-east, is merely the barren top of an extinct crater. Abingdon Island is remarkable for the bold face presented by its western side, which rises 1000 feet above the sea, showing very distinctly the stratification characteristic of volcanic formation. This island is about seven miles long, and rises in one bold peak 2000 feet. Bindlar's Island has its surface formed by mud thrown up from the crater; Tower's Island, unlike the others, is flat; James Island, remarkable for its dome-like mountain, called the Sugar Loaf, 1200 feet high, and its salt lake, occupying a crater in its centre, and producing beautifully crystallized white salt, as also for the abundance of water in its higher grounds, and the richness of its vegetation, is twenty miles long by ten broad. Indefatigable Island has good anchorage to the north-west in Conway Bay, and is twenty-one miles long by fifteen broad. Chatham Island, the most easterly, is twenty-one miles long by six broad; here on the north are numerous fumeroles and truncated hillocks, giving vent to subterranean gases, yet the hills are covered with prickly pears, quince trees, and cotton wood. On the south-east side is a cove with a waterfall thirty feet high; the south side is, like that of the others, verdant and well wooded. Charles Island, though only ten miles long by six broad, is that best known as the resort of whalers, and once the site of a colony, and as having a good harbour, and water easily accessible.

The group covers nearly three degrees of latitude and two of longitude. The importance of its position may be best seen from the following table:—  
Distance of Galapagos from

	G. M.		G. M.
Panama . . .	14° 840	Sandwich Islands .	66° 3960
Conception . .	38½ 2310	Tahiti . . . . .	59½ 3570
Cape Horn . .	58 3480	Easter Island . .	41 2460
St. Francisco .	48 2880	Port Nicholson, N.Z.	92 5520
Vancouver's Island	70 4200	Sydney, Australia	111½ 6690

## CHAPTER XL.

## THE EASTERN COAST OF THE NORTH PACIFIC.

§ 1. The southern coast of Central America.—2. Of Mexico and California.—3. Of Oregon and Vancouver's Island.—4. The north-western Archipelago.—5. The Alaska and the Aleoutian Archipelago.

**THE south coast of Central America.**—The high bluff of Point Francisco may be considered the south-eastern limit of the Bay of Panama; from hence to Point Mala the north-western limit is about 200 miles. From this line to Panama the bay may be 120 miles deep; more commonly, however, the Bay of Panama is considered as lying between Point de Chame and Point Brava, the western limit of the Gulf of San Miguel, between which points the distance is about ninety miles, but even within these limits the bay is thirty miles deep.

The Gulf of San Miguel consists of two parts: the Bay of Guarachiné to the south, between Points Guarachiné and Patnia, and the Gulf of San Miguel proper, between the latter and Point Brava; these are distant respectively about seven and nine miles. The former bay offers nothing worthy of notice, the latter is important as receiving the waters of two large rivers, the Tuyra and Savanna. The Gulf is about sixteen miles deep, narrowing to the north-west, where it is divided into two channels by an island, round which the northern channel, Boca Grande, bends to the north-east and south, having a breadth of nearly two miles with deep water, and the channels, after their junction to the east, have about the same width; here the Savanna from the north and west meets the Tuyra from the south and east, and their united estuaries form Darien Harbour. The Tuyra is about three miles wide at the mouth, the Savanna only one, but both are navigable, the latter for about twenty-five miles; of the former little is known. Within the Gulf and estuary there is everywhere good anchorage, but the shores are low, and covered with mangrove bushes, and the country consequently unhealthy. Several rivers fall into the east of the Bay of Panama, of which the Cheapo is the most important, but it is not navigable; and numerous creeks intersect the coast. In the centre of the Gulf lie the Islas del Rey, or Pearl Islands, the principal of which, Isla del Rey, is seventeen miles long by ten broad. To the west are San Jose and Pedro Gonzales, and to the north a small group, of which the most northern, Pachegue, is thirty-three miles south-east from Panama. These islands, now known as the Islands of Columbia, but formerly from the pearl fishery still carried on there, cover an area of about 400 square miles, are well-wooded and fertile, but comprise numerous islets: the passages between them are only fit for boats.

Off the river Cheapo, and forming a good roadstead, is the island of Chipillo, about twenty-four miles from Panama and three miles from the shore; it is one mile long, and rising with a gentle ascent to the south, it is noted for its salubrity and fertility.

Panama, now so important as the centre of steam communication between



the Atlantic and Pacific, offers nothing better for shelter than an open roadstead: shoal water extends on the south-west one mile and a half from the shore, and at the edge of these banks are several small islands; those nearest to the city, at about two miles and a half, are Perico, Ilenao, and Culebra, these are connected; Isle San Jose lies outside of them, and still further to the south-west, Tortola and Tortolita; a large shoal is also on the south-east of the city at one mile and a half distant. The land at the bottom of the bay is broken by irregular bluffs, and the interior rises in rugged mountains, which, however, are covered with luxuriant forests to their summits.

In its more extended acceptation, the Bay of Panama includes the Gulf of Parita on the west, as well as the Gulf of San Miguel on the east, formerly called *Esenada de Nata y la Villa*, from two towns so named, the latter of which is now called Parita, situated on its shores; from Point de Chame to Point Mala is about seventy-five miles. There are several small islands along the shores of the bay, as well as from Point de Chame towards Panama; of these latter the largest is Taboga, where ships generally take in supplies.

The peninsula of which Point Mala is the extremity, separates the Bay of Panama from Montijo Bay. Here are several small islands, and Quibo Island, nineteen miles long and seven miles broad, in the form of a crescent, opening towards the east; beyond it are Hicaron and Hicarita, small islands, but rising above 800 feet in height, and bearing palm trees, and *Rancheria*, famous for its Palma Maria trees, used by the Buccaneers for masts and spars; these islands were better known to them than they are to us, Quibo being a principal rendezvous for them. Anson describes this island as one continued wood, swarming with tigers, snakes, monkeys, and iguanas, as the sea around did with alligators, sharks, sea snakes, and gigantic rays; pearl oysters also abounded on the rocks, and a river, forty yards wide, fell in rapids of great beauty over a rocky declivity 150 yards long; the cedar trees are remarkably fine. Quibo is low, the highest of the islands being Hicaron or Quicara, to the south.

From the Cordillera, which extends through the isthmus of Central America, but nearer to the north than the south coast, numerous streams and rivers descend to the Pacific; of these the Santiago is the most important, and may be considered the type; at its mouth numerous islands, rocks, and banks cover a good port, formed by a projecting spit of land. This port lies at the head of the Gulf of Puebla Nueva, which is about ten miles broad and the same deep. Similarly the Contreras Islands cover the mouth of the St. Lucia River to the west, but on the east of the Gulf an almost landlocked basin, five miles across, affording perfect security and every convenience, wants but the hand of man to make it the most desirable resort for shipping on the coast. Montuosa Island, about five miles in circumference, and covered with cocoa-nut trees, lies thirty miles west of Quibo, Cebaco, Gobernadone, and others, in the entrance of the Bay of Montijo.

From Burica Point to the eastern extremity of the Gulf of Dulce, the coast is high and covered with trees. The Cordillera, which to the east had scarcely exceeded 7000 feet, here in the Chiriqui Mountain attains to 11,265 feet, and increases in height to the west: of this coast comparatively little is known; within the Gulf of Dulce, which is twenty miles across, or, reckoning from Burica Point, forty, the coast becomes low and covered with trees, and sand banks are marked in the old charts as extending on both sides of the entrance of the Gulf of Dulce; the rivers which flow into it, at least the Rio Dulce, are no doubt navigable, and harbourages covered by islands appear on the west side: the western limit of the Gulf was formerly termed Point Gorda; beyond this is the small island of Cano, and still westerly, Port Mantas, or Aguijas, receiving the river St. Carlos, the mouth of which is covered by islands; from hence the coast trends to the north as far as Point Hermanduras, at the entrance of the Gulf of Nicoya, which is distant from Cape Blanco, the western extremity, twenty-seven miles.

This gulf is an inlet lying deep among lofty volcanic mountains. From Cape Blanco, so named from two white rocks which lie off it, the coast trends north-east for about twenty miles, and then suddenly turning north-west, extends for twenty-five more, forming a deep narrow gulf, having a large island, characteristically called Shoal Island, at its head, receiving many rivers, and forming numerous excellent harbours. The immediate coast is low and extremely rich, covered with a luxuriant growth of timber, but few parts of the unhealthy coast of Central America are more unhealthy than this. Above the eastern coast rises the Aguacate range of mountains, and below the volcano San Pablo is the modern port, Caldera, separated from the older port, Punta di Arenas. The bottom of the gulf is distant only some forty-five miles from the Lake of Nicaragua, the greater part of that distance being up the valley of the Tempisque. On the eastern side the Rio Grande enters the Gulf, descending from the slopes of the Chiriqui Mountain, and to the south of Herradura Point, and the small island Lojarto, is good anchorage.

The mountainous peninsula of Nicoya extends for seventy-eight miles to Point Gorda, at the entrance of the Gulf of Culebras. The coast is irregular, and probably affords good harbourage; Port Guiono, fifteen miles from Cape Blanco, is the most important of its indentations.

From Point Gorda the coast trends northward, and presents four deep bays; of these the southern, Port Culebra, is esteemed the best on this coast; it is marked by the detached islands known as the Viradores, to the south of which lies Cocos Bay. Point Sta. Catalina, of the old charts, lies about twenty miles to the north of Point Gorda, and is the south limit of the Bay of St. Elena, and this is distant about ten miles from Descarte Point, the south limit of the Bay of Salinas, and the north-west point of Salinas Bay. Point Natan is distant twelve miles due south from Descarte Point. The peninsula separating these bays is about five miles long. About ten miles further on is the port of San Juan del Sur, and the little harbour, Nascolo, from whence the coast trends north-west in nearly unbroken line for 100 miles to Realijo, well marked by the volcanic cone El Viejo; this is a good port, and covered by the islands Castanon, Cardon, and the Asseradores, affording two safe entrances. The island Castanon also separates the Estero of Dona Paula from the Pacific. This creek runs up towards Leon, and is navigable to within ten miles of that city. From Rialijo to Point Cosiguina, at the entrance of the Gulf of Concagua, is forty miles more.

This extensive Gulf corresponds somewhat with that of Nicoya, indicating a similar character of country to the west of the great basin of Nicaragua, as that does to the east. It is formed by the peninsula of Cosiguina, on which stands the remarkable volcano of the same name, distinguished by its ragged crater and for the destructive effects of its eruption in 1835, the force of which was felt 400 miles off, and it is said at Merida, in Yucatan, a distance of 800 miles, and the dust from which was wafted as far to the northward as Jamaica (vol. I. p. 269). The entrance of the Gulf is about twenty miles across, and marked on the north-west by another volcanic cone, known as Mount St. Michel.

This Gulf, formerly known as that of Amapalla, and often called Conchagua, or Fonseca, was well known to our early voyagers, and accurately described by Dampier; is about twenty-five miles in depth, and studded with islands, of which Tigre Island, Sacate, and Mianguera are the principal. These islands do not now appear to answer the description given of them by Dampier, and it is probable that they have undergone alteration since his time; he calls the two principal Mangera and Amapalla, and places the former to the south, but makes the latter the largest, describing them both as lofty, while the others are all low, and says that the two channels for entering the Gulf lie, one between those islands, the other between Mangera and Point Casirina, *i.e.*, Cosiguina; in the channel, are now the Farrallones islets. To the east the Gulf stretches for fifteen miles, having a breadth of eight, and on

the west forms a bay eight miles deep and three miles wide, in which is the port of La Micon, which lies to the north of Chiearene Point. The shore here is flat, and on the shoals oysters abound. Two considerable bays are also formed to the north, the easternmost of which is Port St. Lorenzo, into which falls the river Nacaome. In the north, of St. Michel, also called Candadilla, is the estuary of the small river Sirama, and beyond is the cone of Amapalla, 3800 feet in height, beneath this is the port of San Carlos, or Concagua, off which is the small island Concaguaita. The eastern arm of the Gulf receives the Choluteca, a considerable stream. The Estero Reale is navigable for small vessels for sixty-five miles towards Lake Managua.

2 *The Coast of Mexico and California.*—From the Gulf to Sonsonate Road, a distance of above 100 miles, the coast is only broken by the Bay of Gequilisco, which affords well-sheltered anchorage, being covered with a long narrow island: beyond this is the River Lempa, which, though the largest on this coast, is not navigable. Sonsonate Road, known also as Port Acajulta, is an open bay formed by Point Remedios; there is an open roadstead also at Port Islapa at the mouth of the Michatoya, which is the outlet for the waters of Lake Amatitlan, and said to be navigable. This roadstead is the one from which Alvarado embarked for Peru, and is marked by the famous Volcano di Agua, placed at right angles between the Volcanoes de Fuego and Pacaya. From Point Remedios the character of the coast changes; the Balsam coast to the east is bold, but to the north the coast is low and covered with low islands, intersected by canals often forming lagunes, which extend beyond the mouth of the Gulf of Tehuantepec, and make the coast inaccessible for ships of burden: indeed, this coast must have undergone much alteration since the time when Cortez selected Tehuantepec for his principal port on the Pacific, the lagunes there being now inaccessible to vessels of burden, and rapidly filling up. On a coast so deficient in harbourage, the bays of Bamba and San Rosario are worthy mention: there is also good anchorage behind the island Tangola. The coast here makes in small steep headlands with sandy beaches between them, rising in irregular hills covered with primeval forests to the Cordillera. Port Guatulco, formerly of importance, is still a most excellent harbour: the Spanish town here was taken by Drake, and burnt by Cavendish; to the north and west the Cerro Zadán rises 6000 feet above the sea, and over it the mountains of the interior are plainly visible. The little green island of Sacrificios also offers shelter from the terrible swell of the Pacific: the coast here is comparatively barren. Acapulco is one of the finest harbours in the world, whether for capacity or safety; from its interior, the sea cannot be seen; it looks like a lake surrounded by mountains, those on the north and east rising from 1500, 2000, to 7000 feet; but on the west the hills do not exceed 500. The coast here is extremely prominent and bold, rising 3000 feet above the sea. To the westward are the Paps of Coyuca, resembling a mountain fortress, and here the coast is formed by long beaches bearing the same name, and 120 miles from Acapulco is another excellent harbour, Sihuantango, the Chiquelan of Dampier.

The port of Manzanilla is very good; it is marked by the volcano of Colima, the most westerly of those of Mexico, which rises 12,000 feet above the sea; and another extinct crater to the north, which exceeds it in elevation. The land about this coast is high and barren, the coast itself irregular, and there are anchorages between Manzanilla and Cape Corrientes. This cape has a remarkably bold outline, is covered with underwood, and is situated in latitude  $20^{\circ} 25'$  north, longitude  $105^{\circ} 39'$  west. Of the Peninsula and Gulf of California we have until lately known nothing beyond what the exclusive policy of the Spaniard has permitted, nor indeed has further knowledge been required for any practical purposes, for the country surrounding it has hitherto been isolated from other parts of the Continent; now, however, that Northern California is opened to commerce by its accession to the American Union, the unknown Gulf will, no doubt, soon become

well known; and Sir E. Belcher has, by his examinations and surveys, afforded a base for further operations. The peninsula may be roughly estimated as 600 miles in length, and about 100 in average breadth, the gulf being of about the same dimensions; a range of mountains passes through the centre of the peninsula throughout its whole length; of the character of its interior we are ignorant, but its appearance is rugged and barren, its mountains are of volcanic origin, and, though lofty towards the north, decrease in height to the southward.

The Gulf has had many names: it was called the Sea of Cortez, after its discoverer; the Red or Vermilion Sea by the Spaniards; by the Jesuits, the Sea of Loreto, after the so-called home of the Virgin Mary: it was also remarkable in the early days of Spanish occupation for the great size and beauty of the pearls, and the productiveness of its pearl fisheries. From Cape St. Lucas, the southern extremity of the peninsula, to Cape Corrientes, which may perhaps properly be considered as the limits of the entrance of the Gulf, is nearly 300 miles; and from Cape Corrientes to the mouth of the Colorado, about 850. Cape St. Lucas is in lat.  $22^{\circ} 52' N.$ , long.  $109^{\circ} 53' W.$

The coasts of the Gulf are low, sandy, and barren for the most part; but as far on the east as the mouth of the Cinaloa River, about 200 miles from Mazatlan, where the sierra of the same name approaches closely to the sea, it is rocky, neither the river Cinaloa nor the rivers Piaxtla, Tamazula, or Río del Fuerte, appear to be navigable, though their mouths are accessible to small vessels. The harbour of Guaymas, however, is well sheltered, has depth of water for large vessels, and is of considerable capacity; the inner basin is protected by two small islands, and the island of Pajaros covers the entrance, the eastern point of which is formed by the islet of Morro, which is connected with the eastern shore of the Gulf by a spit of sand. Guaymas is surrounded by high mountains, one of which, named Las Tetas de Cabra, from its double peak, presents a well-defined landmark. There is another good harbour to the north of Guaymas, Puerto Escondido; here are also some small islands,—San Pedro, Nolasco, La Tortuga, and San Pedro, and in latitude  $29^{\circ}$  that of Tiburon, ten leagues in length, separated from the land by the narrow and dangerous canal, Peligroso. The Río de la Concepcion de Caborca, the small bay Sta. Sabina, the islet Sta. Inez, and the Río de Sta. Clara may be named, but the entire north-east coast is a barren waste of sand.

The Río Colorado, although presenting a considerable body of water, is not navigable on account of the rapidity of its current, nor is its entrance accessible to vessels on account of the sandbanks which impede it. Of the western shore of the Gulf little can be said; it is marshy as far as Cape Buena-ventura; below this are a few unimportant islands and watering-places, but the first of importance is the island De los Angeles, nearly opposite that of Tiburon, about forty miles long, and separated from the western coast by the Canal de Ballenas, so named from the number of whales found there; indeed, the whale and seal fisheries on this coast would, if followed, be highly productive. The southern extremity of this canal is rendered dangerous by several rocky islands.

To the south is Cape de los Virgenes, marked by an extinct volcano, the last on this coast, which however is reported as in activity in 1745; and below this to the south Moleje Bay, the only considerable inlet, being about thirty miles deep, and receives the river of the same name, which, however, is scarcely accessible to boats. To the south, the small islands and indentations of the coast present safe anchorages, especially under the islet Carmen, and at Loreto, marked by the highest peak in Lower California, Cerro de la Giganta, which culminates 4560 feet above the sea; this was a place of much importance during the rule of the Jesuits, but is now deserted. Carmen Island is one of a chain which stretches southward, covering the coast to the eastern extremity of the Bay of La Paz, originally called Santa Cruz, and subsequently Del

Marques del Valle, the title of Cortez : from this place the pearl fishery is still carried on. The anchorage here is in Pichilingue Bay, covered by the islands San Juan, Nepumoceno, and Espiritu Santo. Towards the south the peninsula has wood, and for this the dangerous bay of San Jose del Cabo is frequented, as well as the not much safer bay of San Lucas. The country here is mountainous, of primitive formation, the coast bold and steep. Cape San Lucas is a moderately elevated rock connected with the interior range of mountains by a serrated ridge: the country here is barren and sterile. From the Cape to the island San Margarita, on the western coast, steep, white, rocky cliffs, apparently detached, are found, the country rising behind in lofty mountains. The most remarkable headland on this coast is that under the forty-fourth parallel, named from its three truncated peaks, Las Mesas de Narvaz.

Sta. Margarita Island, twenty-two miles in length, but only two miles and a half broad, having the usual character of the islands of the Pacific, indicating its origin, is formed of two elevated portions, connected by a low sandy isthmus; the southern of these rises near Cape Tosco, the south-east extremity, 2000 feet above the sea.

This island covers an extensive bay formed by a promontory, of which Point St. Lazarus is the western extremity; here are two deep indentations affording excellent harbourage, Almejas Bay to the south, and Magdalena Bay, the larger, to the north; the former is twelve miles in extent, and covered by Mangrove Island, which is low; the latter is very extensive, and not fully explored, having numerous deep inlets which the French surveyors have named; Sir E. Belcher even thought these might be found connected with those from La Paz Bay, on the opposite coast. The mountains here are distant from the coast, which is for the most part low, the highest land being Mount Isabel, three miles and a half from Entrada Point, the southern extremity of St. Lazarus Promontory, which is only 1270 feet high; it is distant from Cape Redondo, the northern extremity of Magdalena Island, two and a half miles.

This coast appears to have been recently subject to upheaval, and to have been raised from below the sea level at no very distant period.

Cape St. Lazarus rises 1300 feet above the sea; between it and Abrejos Point, distant about 130 miles, the coast makes a deep bend, terminating below the latter in Ballenas Bay, an open and rocky roadstead. To the north is the threefold Bay of San Bartolome, affording good harbourage, and surrounded by mountains; and northward of this, Point San Eugenio forms the southern extremity of the extensive bay named San Sebastian Viscaino, after the well-known Spanish navigator. Off this point lies the small island La Navidad, and beyond, to the north, the larger island Cedros or Cerros, which is about thirty miles long, rugged, and high, with a remarkable peaked mountain at the southern extremity; this island covers the bay. The islets San Benito lie twenty miles to the north-west.

Northward the coast is dreary, being either sandy or volcanic. St. Quentin Bay, formerly known as San Francisco, affords good shelter, and is marked by a headland having five hills, from which it was once named; it is the Bay of Virgins of the early Spanish navigators, and the Cape retains the names, and its north point is Point Zunigas of Vancouver, off which lies the small but remarkable volcanic island, Cenizas or St. Hilario; the rocks are of recent volcanic formation, and the low lands covered with scorice; Cape Colnett is remarkable for its distinctly marked stratification, dividing it horizontally into two equal parts. To the north of this the mountains approach closely to the coast, which is lofty and rugged; here are the bays Los Todos Santos and San Diego, the latter an admirable harbour for vessels under 300 tons' burden; and to the north of this point the beautiful and fertile valleys of Upper California open on the coast. Portions of the coast here are low lagoons, and bituminous springs are found. The roadstead of Sta. Barbara affords good anchorage.

Point Conception is a remarkable headland rising perpendicularly out of the sea, and sloping gradually towards the low land with which it is connected; it is nearly 300 miles distant from Cape Colnett, and about 480 from Cape St. Eugenio, the coast forming an extensive bend between them marked as at the south by Cedros Island, so at the north by several, forming two groups, Sta. Catalina, and San Clemente, and Sta. Barbara on the south, and Sta. Cruz, Sta. Rosa, and San Bernardo on the north, these latter, with the mainland, form the channel San Bernardo.

Between Point Conception and Point Pinos, distant about 150 miles, the Sierra Sta. Lucia, which culminates 2700 feet above the sea, runs parallel and close to the coast; this is covered with wood, for the most part pine, but the comparative moisture of the climate keeps the valleys extremely fertile and verdant; Point Pinos forms the southern limit of the Bay of Monterey.

This bay, though so well known and capacious, being eight miles wide and six deep, is difficult of approach, on account of the fogs in which it is almost constantly enveloped, and by no means safe as an anchorage, while landing is difficult, from the heavy surf which rolls in on the sandy beach. It is noted for the numerous whales and pelicans which resort to it. The pine and oak forests here afford timber of excellent quality, only inferior to that in the north; from hence a sandy barren coast extends for thirty miles to the Bay of San Francisco.

This vast bay or harbour is one of the best, as it is one of the largest in the world; indeed, one of its faults is its size, which gives to the larger portions of its surface the character of a roadstead rather than a harbour: much of its southern side is also shallow, the entrance is narrow, and the coast exposed, and consequently the rollers set with great force on the bar. The channel by which this harbour is entered is about two miles wide and six long, having everywhere more than twenty-six feet water; the points at the entrance are, Lobos on the south, and Bonita on the north. Alcatrazes Islet faces the inner mouth of the channel, and commands the entrance from within.

The harbour or gulf of San Francisco forms two deep bays to the north and south; that on the north forming the richer harbour of San Pablo, about five miles broad, the entrance to which, between Points San Pablo and San Pedro, is about one mile and a half wide, opposite which are two deep bights: and further south, on the west shore, Sausalito or Whalers' Bay, covered by the island Los Angeles, the largest in the whole harbour. San Pablo Bay is surrounded by high hills, and the cliffs at the entrance are of sandstone; it communicates by the Strait of Karquines with Suisun Bay, into which the river Sacramento falls. This bay winds fifteen miles to the south and east, and then stretches away twenty more to the north; vessels of the largest class can lie close to the shore. Towards the east the Sacramento River is also navigable, but to the north it is more shoal. The banks of the Sacramento are clothed with clumps of fine plane and oak trees, disposed in park-like order; the river frequently overflows its banks, and its floods are very destructive. Yerba Buena Cove lies to the south-east of the inner mouth of the entrance to San Francisco Harbour; it offers a fine roadstead, covered by the island of the same name, distant one mile and a quarter.

The land about this vast sheet of water is generally low, but the hills in the interior are high, and the country rises rapidly to the snow-capped sierra. The Sierra Diavolo, 3770 feet high, is opposite the entrance of the harbour, and marks the position of the mouths of the Sacramento and San Juan Rivers.

The peninsula which forms the outer basin of the harbour is marked by the Sierra San Bruno, which culminates in Blue Mountain, 1087 feet high. The northern peninsula is marked by Table Hill, 2569 feet in height, which is placed at the intersection of the two ranges, forming Whalers' Cove, and is seven miles and a half distant from the entrance of the harbour.

From the entrance of San Francisco, the coast trends north-west to Cape Mendocino, distant about 175 miles, and from thence nearly due north for

500 more to Cape Flattery, at the entrance of the Strait of Juan de Fuca. Few lines of coast of the same length are less broken, or afford less harbourage. To the north of the entrance of San Francisco is Port Sir Francis Drake, formed by the northerly extension of Point los Reyes; it is surrounded by low white cliffs; here, as Vancouver supposes, Sir Francis Drake anchored and found shelter, but it is exposed to north and north-west winds. The Farrallones, a cluster of rocky islets, but rising 300 feet above the sea, lie off this port; beyond, the coast is high and rocky, but broken by the deep valleys, through which several streams find their way from the mountains to the sea.

3 *The Coast of Oregon and Vancouver's Island.*—Cape Mendocino presents two lofty promontories about ten miles apart, the northern probably being the true cape, though the southern is the highest; this is sometimes marked Point Gorda. Here the south-western spurs of the Great Sierra Nevada, which separates the valleys of the Sacramento and Columbia, stretch into the sea; to the north-east the apparently detached peak, Mount Shaste, which approaches 15,000 feet in elevation, marks not only the mouth of Smith's River, which is available for vessels of some draught of water, but the point where the coast range detaches itself from the Sierra Nevada trending north and west towards the mouth of the Columbia, and continued beyond it to Cape Flattery, and through Vancouver's Island, to the archipelago of the north coast.

Mount Shaste, like many other peaks on this coast, is a volcano, which has been in action at no distant period of time; from its sides, Smith and Clamet Rivers flow to the sea, their valleys limited to the north by another transverse spur, which forms Cape Blanco or Orford; to the north of which several small rivers flow from the western slopes of the coast-range to the sea, but none are navigable, nor does the coast present any harbour. To the south it is high, rocky, and comparatively barren, though in many places covered with pine forests; to the north it is low, and the country undulating, and well clothed with timber, but rising inland in lofty and rocky peaks; the littoral being marked by occasional lines of sandy beach; but neither here are there good harbourages, although the mouth of the Umqua admits small vessels. From the north, Cape Orford appears as a long, low, rounded promontory, terminating in a high and precipitous cliff.

Cape Foulweather is a fine bold headland, and beyond it the coast rises, becomes steep and rugged, though in the valleys clothed with verdure, but gradually declining towards the mouth of the Columbia River, the southern point of which, named by Vancouver, Adams, is a long, low tongue of land, covered with lofty timber trees.

This river is navigable for fifty miles to the head of the tide water for vessels drawing fourteen feet at all times, but the surf on its outer bar is extremely heavy, and the entrance dangerous, although Point Adams is four miles and three quarters from Cape Disappointment, the northern limit of the entrance. There appears to be no danger in the river navigation, although, from the tortuousness of the channel, it is tedious. Baker's Bay, behind Cape Disappointment, affords good anchorage, as does Grey's Bay, some eight miles higher up, behind Chinook Point: the mouth of the Willamette River also admits vessels of burden. This is the outlet of so extensive a valley that it cannot but hereafter become a port of first-rate consequence.

To the north of the mouth of the Columbia is Grey's or Whidbey's Harbour, which, though shoal, affords good anchorage and shelter, and receives the river Chekelis, which is also navigable for vessels of 200 tons for eight miles. From hence the coast gradually rises and becomes rocky but well wooded, the country inland mountainous, and culminating in Mount Olympus, 10,000 feet above the sea. It is dangerous from the rapid currents which set on it, especially from the north and west: there are also detached rocks, and one rocky island, named Destruction Island, about a league in circumference. Cape Flattery, remarkable as the point from

whence Cook stood off the land at night and so escaped discovering Juan de Fuca Strait; the great navigator describes it as having a round hill over it, and says all the land upon this part of the coast is of moderate and pretty equal height, well covered with wood, and of a fertile and pleasing appearance; Vancouver has represented the greater part of it with much accuracy. It may, however, be added to this, that the interior is a mass of irregular mountains, culminating in Mount Olympus, 10,000 feet above the sea. The country between the Columbia, the Strait of De Fuca, and Puget's Inlet, forms indeed an extensive promontory, not less remarkable for its beauty than fertility, and attached by the low watershed of the valley of the Cowlitz to the continent.

The Strait of Juan de Fuca is universally recognised as the future centre of the trade of the north-west coast of America; few, if any, inlets of the ocean on any part of the globe present equal, none certainly superior, facilities for such a purpose than this; the safe anchorages and good harbours abounding in it are far too numerous even for mention; and throughout the 2000 square miles of area over which they are calculated to extend, there is no danger to the navigation of the largest vessels; its entrance is limited to the south by Cape Classet and Pillar Rock, a remarkable landmark rising from the beach, about 400 feet in height. Half a mile off the Cape lie Tatouche Islands: they are small, flat, rocky, and surrounded by numerous other rocks.

The northern shore of the Strait is formed by Vancouver's Island; of the southern little need be said; Neah Bay, five miles from the entrance, Callan Bay, seven miles further east, and Port Angeles, nearly thirty miles from the entrance, offer harbourage, and behind New Dungeness Point there is secure anchorage; but these are of no account in comparison with the almost unequalled character of Ports Discovery and Townshend, which, separated from each other by a peninsula from two to three miles in width, afford not only safe anchorage for any number of the largest vessels, but facilities for the construction of docks, scarcely to be met with elsewhere; in addition to a safe and extensive roadstead formed by Protection Island, off the mouth of the former.

Port Discovery is about seven miles deep and two miles wide, perfectly sheltered, with deep water and safe anchorage everywhere. Port Townshend is about five miles deep and two miles wide; it is covered to the east by two islands, lying parallel to each other; that to the west is three miles long by one broad, and that to the east five miles long by one broad, the channel between having from three to eight fathoms of water, and the south point of the west island connected with the main by a bank; and here is the entrance to Admiralty Inlet, leading to Puget's Sound, Hood's Canal, and their numerous bays, coves, harbours, and islands.

Points Wilson and Hudson form the extremities of the peninsula already named; these are distant from each other about two miles, and the former from Point Partridge, forming the entrance to the inlet, about five miles. This latter point is the west extremity of Whidbey Island, which is of irregular form, about thirty miles long, and Port Gardner is the entrance to Suahomis River. Hood's Canal, the mouth of which is about ten miles distant from the south extremity of Port Townshend, extends about fifty miles into the land, with an average breadth of two miles, and deep water everywhere. At its entrance are Ports Ludlow and Gamble; within it, Suquamish Harbour, and Dahap and Colseed Inlets. Possession Sound, eight miles wide, to the south of Whidbey Island, forms the entrance to Puget's Sound, which stretches seventy miles into the land, and terminates to the south in four inlets, each about eight miles deep, trending south, besides two larger ones to the north; in its course to Fort Nisqually, at its south extremity, its breadth, which is very unequal, may average two miles: its extreme breadth across Vashon Island, nine; its least width in the narrows below, one: it carries deep water everywhere; the river Sinawamis debouches on its eastern shore: Ports Madison and Orchard, covered by Bainbrigg Island (eight



miles long), afford most secure harbourage on the west; while to the south and east it may be considered one extensive harbour. Case Inlet, the most northern of those at its extremity, approaches within two miles of Hood's Canal, with Kelmso pond between them.

It has been noted that the north shore of Juan de Fuca's Strait is formed by Vancouver's Island; the eastern extremity of this lies north of New Dungeness, and between that and the land a group of islands which has never yet been fully surveyed, and which covers an area of twenty-seven miles from east to west, and twenty from north to south, and is separated from the island by Haro Strait, called by Vancouver—Canal d'Arro. The principal islands are Lopez on the south, San Juan on the west, and Orcas on the north. Rosario Strait affords a navigable channel between these and the smaller islands, Fidalgo, Guemes, and Cypress, which lie to the north of Whidbey's Island, and close to the land: and, with M'Laughlin Island, cover Bellingham Bay, which extends for fifteen miles in breadth, and five in depth; having its entrance between Points Francis and William, eight miles apart.

This group forms the southern portion of the Haro Archipelago, which stretches along the south-east coast of Vancouver's Island for more than sixty miles. The middle group, consisting of Saturna and two other islands, forms with the southern port St. Antonio; while the northern consists of a chain of islands separated by Dod's Passage from the shores of Vancouver's Island. To the north of this Archipelago, stretching from Bellingham Bay to the north-west, is the Gulf of Georgia, which may be estimated as 120 miles long and twenty-five broad, and which is connected with the sea to the north by Seymour's Narrows and Johnstone's Strait, which stretch north and west 150 more to the extremity of Vancouver's Island.

This island, now called after the great discoverer and surveyor of these regions, was originally named by him the Island of Quadra and Vancouver, in compliment to the commander of the Spanish squadron whom he met there, and whose officers surveyed the east coast of the island, which, in consequence, has not been so accurately rendered as the coast line of the continent, to the delineation of which, as given by him, subsequent surveyors have added but little.

Vancouver Island\* is in extreme length from south-east to north-west 250 miles, and in extreme breadth seventy-five; the main watershed lies nearer the west than the east coast; the western slope is of primitive rock, and indented by numerous gulfs, bays, fiords, and canals: the eastern is of the carboniferous series, and affords extensive and valuable fields of coal, which, in so far as they are now worked, give importance to this island in the trade of the Pacific, and must make it the most important portion in this respect of the north-west coast, on which, south of this, so far as is known, coal does not exist. From Cape Classet to the opposite point of Vancouver's Island, Bonilla Point, is thirteen miles and a half, and from thence to the extreme southern point of the island, Cape Church, where it narrows to nine miles, the shores of the Strait are nearly parallel. The southern shore of the island is within that distance broken by Port St. Juan, four miles deep and one and a half broad near the entrance, and by Sooke Inlet and Becher's Bay near the eastern extremity, the former of which terminates in Copper Cove, a basin about two miles in diameter; while round the south point of the island, Esquimalt and Victoria Harbours lie open to the north-west of Ports Discovery and Hudson, from which they are distant twenty-seven miles. Esquimalt Harbour extends for one mile and three-quarters in nearly a direct line to the north, forming on the east the triangular harbour called Village Bay, one mile and a half long by three-quarters broad, with another smaller bay to the north. The entrance of the harbour is half a mile wide, but there are islets and rocks which impede it. Victoria Harbour is an irregular canal, four miles deep, terminating in marshes, and forming West Bay and James' Bay on the east; its entrance is about a quarter of a mile wide; it was originally called Camosac. The southern extremity of Vancouver's Island forms a bay twelve miles in extent

\* See *Journal R.G.S.*, vol. xxvii., Col. Grant's paper, with map.

from south-west to north-east, called Royal Bay. The shores here are comparatively low, fertile, and well wooded, but opening on grassy prairies; the islands of the Haro Archipelago are also well wooded.

Dod's Passage is navigable: at the south is a deep inlet named Saamitel; at the northern extremity is Nanaimo Harbour, covered by Newcastle Island, and forming three inlets available for shipping; here the coal crops out on the coast in thick seams, and extends northwards along the coast for thirty-five miles to Valdez Inlet, which is ten miles deep. There is nothing further remarkable on the west side of the Gulf of Georgia. The east side is of a very different character; for, although as far as the mouth of Frazer River it is low, well-wooded, and fertile, from thence it becomes rugged, high, and rocky, lofty mountains approaching close to the coast, and deep indentations and fiords extending far up the valleys between them. Birch Bay lies to the north of Bellingham Bay, and is separated by another bay, formed by Point Roberts, from the mouth of Frazer River, which has formed a delta, and enters the sea by three channels, about eight miles apart. This river is navigable for vessels for twenty-five miles, but not even for boats in its upper course, on account of the rapidity of its current and numerous rapids and falls.

The sounds or fiords between Frazer River and the Narrows, are Bernard's Canal, Howe's Sound, and Jarvis' Canal; off the latter is Feveda Island, remarkable for its limestone rocks and the quality of its timber; Sangster Island lies to the south, and it is separated from the main by Malaspina and Rosario Straits; it is about thirty miles long and five in average width. Harwood and Savory Islands lie to the north, and beyond, at the entrance to the Narrows, an archipelago covering the mouths of Desolation Sound and Bute's Canal, the former named from the rugged and barren cliffs which characterize this coast, on which are only found a few pine trees, and down which the cataracts incessantly rush to the sea, and form the sides of the snowy range which rises above them.

Seymour's Narrows extend from Point Mudge to Point Chatham, twenty-five miles, with an average width of one mile and a half. At the entrance of Johnstone's Strait, here five miles wide, Thurloe Island covers Loughborough Canal; Hardwick's Island succeeds, then Port Neville, then Call's Canal and Knight's Canal, and the deep inlets about Port Philip, covered by Broughton's Archipelago, extending for thirty miles along the north coast, above which towers the rugged summit of Mount Stephens. On the southern coast there is Salmon River, but nothing worthy note until, at Neil Harbour and Beaver Harbour, so named from the vessel by which it was first discovered, coal is again found. Malcolm, Cormorant, and some other islands, cover this part of the coast, and connect the south extremity of Broughton's Archipelago with the islands of Galliano and Valdez to the north, which are separated from the main island by the Golitas Channel, about two miles in width; they extend for about twenty miles in length and five in breadth, and here on the south side of the channel is the harbour of Newetsee or Shoshautee. Cape Scott is the north-west extremity of Vancouver's Island, beyond it lie Scott's or Beresford's Islands, the largest of which is about five miles long, high, and rocky; the most westerly is fifteen miles further to sea, and there are numerous rocks between.

The northern part of Vancouver's Island is comparatively low, but the west coast rises and becomes rugged from Woody Point, fifty miles from Cape Scott; between these two points are several beautiful bays—opening into a fertile, well wooded, undulating country, with open prairies, abounding in game and fish—of which the only one known is the Sea Otter Harbour, and St. Patrick Bay of Hanna, which is the Bay of San Josef of the Spaniards. Sea Otter Harbour is an oval basin four miles long by two broad; St. Patrick's Bay is seven miles long by three broad, it receives the waters of several streams. From Woody Point, southwards, the coast approximates in character to that of the mainland. Nootka Sound is now known to be separated from a similar sound to the north, by the triangular island now called

Nootka, the sides of which may be roughly estimated at twenty miles in length, and at the south-east extremity of which is the Friendly Cove of Cook; these sounds terminate in five canals, the centre of which forms a basin, which receives the waters of two small rivers. Clayoquot Sound is covered by Flores Island, forming two entrances twelve miles apart, and Wicananish or Port Cox terminates in Tosino Inlet, twenty miles in length. These all partake of the same character as those on the mainland, but the rocks are not so high, and the trees much finer, and snowy mountains in the interior are wanting, though the mountains near the east coast sometimes retain their snowy covering till July; but Nittinat or Barclay Sound approaches nearer to that of the southern portion of the island. This sound is about fifteen miles wide and the same depth, forming two deep inlets, the Boca de Canavera to the north, of which nothing is known, and the Alberini Canal on the south, which extends from the head of the sound nearly fifteen miles, and approaches within eighteen miles of the east coast of the island; at its mouth is Port Elingham, about three miles deep by one broad, and affording all possible security and good anchorage. There are many islands in the sound, and from Cape Beal its southern limit to Bonilla Point is sixteen miles, from its northern limit to the entrance of Port Cox is twenty-seven miles, and from Point St. Rafael, at the northern entrance of Clayoquot Sound to Point Breakers, at the southern entrance to Nootka Sound, is nearly ten miles; probably no coast has more places of safety for vessels within the same distance.

4 *The North-west Coast.*—To the north of Vancouver's Island the same character is maintained along the coast which has been already observed, but that the mountains recede from the coast, the fiords become longer, and sometimes terminate in fertile valleys, and receive the waters of considerable rivers: the timber also, though still chiefly pine, is of large dimensions and regular growth.

Queen Charlotte's Sound, which leads to Johnstone's Strait, lies between the northern part of the island and Cape Caution. Twenty-three miles distant from each other, to the north of Cape Caution, are Smith's Inlet and Rivers' Canal; and, from hence, Fitzhugh Sound stretches northward, separating Calvert Island and the southern of Princess Royal Islands from the main, and terminating in four deep canals to the east, into the southern of which falls Salmon River, by which Mackenzie reached the sea, to inscribe his name on Point Menzies, which Vancouver had reached only a few days before.

Princess Royal Islands extend about 100 miles, and Pitt's Archipelago for about the same distance along the coast; and off these, at a distance of about forty-five miles, lie Queen Charlotte's Islands, as they are now known to be, divided into three principal parts, or groups, of 150 miles in length, with a base to the north of sixty miles; they are mountainous, but well wooded and fertile, abounding in minerals, and producing gold in some abundance; the southern point, Cape St. James, is distant from the nearest point of Princess Royal Islands about 100 miles; while the north-east point, Ymbisble, is distant only twenty-five. The northern group is divided from the central by Rennell's Sound, which is very extensive, and presents numerous indentations; the cliffs here are high and rugged, Hippa Island lies off the north entrance. Cartwright's Sound and Englefield Bay represent other dividing channels, in which numerous good harbours are afforded on the western side; but of the east little or nothing is known.

Prince of Wales' Archipelago lies about thirty miles to the north of Queen Charlotte's Islands; it extends for 100 miles in length and forty-five in width, being separated from the mainland, the islands of Revilla Gigedo, which lie at the entrance of Behm's Canal, and Duke of York Island, separated from them by Prince Ernest's Sound, by the Duke of Clarence's Strait, which also separates it from another archipelago to the north, unnamed, but which, more properly, may be considered as forming part of it. To the north, again, is Admiralty Island, about seventy-five miles long, sepa-

rated from the main by Stephens' Passage, which terminates in Lynn Canal, the last on this part of the coast; from which, to seaward, lies King George the Third's Archipelago, extending for 125 miles in length by forty-five in breadth, separated from Admiralty Island by Chatham Strait, the north-west extremity of which is distant about ten miles from Cape Spencer, the south extremity of the mainland to the north; the entrance here is called Cross Sound.

These archipelagoes abound in secure bays and harbours; but, excepting for the fur trade, whale fishing, or for timber, there is nothing at present to bring vessels to the coast; and from trade on this coast British subjects are prohibited, by the licence of trade granted to the Hudson's Bay Company. In King George the Third's Archipelago is Sitka, or New Archangel, the Russian Fur Company's settlement, on the island of the same name. The port is formed by a cluster of small islands, and marked by the dome-like snowy cone of an extinct volcano.

From Cape Spencer, the character of the coast changes; the mountains rise, as it were, out of the sea; glaciers fill the valleys; and the snowy summits of Mounts Fairweather and St. Elias tower above the scene: yet, in the bays, fertile and wooded valleys are not wanting, although the coast is rugged and rocky in the extreme.

Behring's Bay lies between the mountains already named: here the coast trends to the west. Prince William's Sound extends for above 100 miles, covered by several islands, of which Moulagin Island is the largest, and beyond, Cook's Inlet stretches 150 miles into the land; and receives from the west the surplus waters of Ilaeen Lake, lying at the foot of the volcano of the same name; which, with others, form the south extremity of the Tshigmit, or Big Beaver Mountains, which form the limit of the Valley of the Yucon in that direction, and from which the rivers flowing into Behring's Straits fall. From hence the coast bends southerly; and here are the Kodiak, or Kekklak, Islands, separated from the main by the Strait Chilikof, or Chilighoff, above 100 miles in length; and from hence the Peninsula of Aliaska and Aleoutian Islands stretch to the south and west towards Kamtschatka.

The Kodiak Archipelago differs little from those already described on the north-west coast. Its eastern shore presents several good harbours; of which the best is that of St. Paul: the western coast is little known.

5 *Aliaska, and the Aleoutian Archipelago.*—The Peninsula of Aliaska is in length above 300 miles, about 100 miles wide at the north, and gradually diminishing towards the south: it is high and rocky; presents active volcanoes; and has numerous lakes in the interior, by which passage is obtained across it. The most remarkable of these is Lake Nauonantouhat, which is connected with the sea by the river Ougagouk, which falls into the Bay of Pasto.

The small groups of islands named Eodokuf, Tchirigov, and Schemagin, may be considered an extension of the Kodiak Archipelago to the south: they are rocky and barren.

The Aleoutian Islands are separated from Aliaska by the Strait Isanotskoy; of these the first is Ounamuc, or Ounimack: they have been divided into several groups; the western, or Blignie, consists of Attou, Agattou, Semitsch, and Bouldyr; there are also the Rat and the Andrianoff Islands: while the eastern group is known as the Fox Islands, and extends from Onnimack to Amoukta.

Ounimack may be fifty miles long by twenty-five broad; it consists of numerous volcanic mountains, and culminates on the Chichaldinskoi Volcano, 8935 feet above the sea, and nearly in the centre of the island, Ruruk or Ommack Strait, is the best passage to Behring's Strait. Akoun is mountainous and precipitous, and has a volcano on its north-west extremity. Akoutan has a diameter of about twelve miles, and a volcano in the centre, rising 3332 feet above the sea. The largest and best known of these islands is, however, that of Ounalashka, or Nagomalashka, which is seventy

miles in length; it has several good harbours, principally on the north shore. Illuluk, on the east, is excellent, but has a difficult entrance.

The Bay of Otters, or Bobrosaca, presents numerous safe coves and anchorages; it is formed by a peninsula, at the extremity of which is the Saganooda Bay of Cook. The Bay of Killialack, on the east coast, is also an excellent harbour. Ounalashka is of very irregular shape, the peninsula forming the Bay of Otters and Makouchinskoy Bay being forty miles in circumference; here are lofty mountains, among which the crater of a volcano is conspicuous. Onnimack, the next in size to Ounalashka, from which it is separated by a strait four miles wide, is sixty miles in length; it is the Amoughta of Cook; the mountains on the north of this island are covered with perpetual snow; it has two active volcanoes—Vedonskoi, in the centre, which is the culminating point, and Tonliskoi, ten miles from the north-east side. The south coast of this island is steep and not very high, nearly straight, but presenting a few coves; here grass flourishes, and potatoes and turnips are cultivated, and a river discharges itself into Glonbokaia Cove; the east coast is steep and rocky, but not high; the north, though sandy, regular; the west coast is mountainous, but not steep. The island is remarkable for its hot springs.

To the north of Onnimack is a long reef, marked by a rock, named by Cook from its appearance Tower Rock; and within this the small volcanic island, Joann Bogasloff, which has appeared since 1796: it culminates 2240 feet above the sea. Yaounashka, to the south-west, is a mass of rocks almost inaccessible.

Amoughta, or Amouktou, the most westerly of the group, is about six miles in diameter, and nearly round. It is mountainous; its coasts low, but steep and unbroken.

Of the Andrianoff islands but little is known; Segonam or Gorelli is easternmost, and is distant from Amoukta fifty-five miles; it is larger than that island, and seems to be divided into three great volcanic masses. Amlia is narrow, and may be forty miles long; it is mountainous, but has no active volcano; on the south shore is Schretinkoff Harbour, one mile and a half deep and one mile and a half broad, sheltered at the mouth by an island and reefs on the east, but leaving an entrance open to the west. This island produces abundance of grass.

Atcha, or Atkha, is the largest of this group, being more than fifty miles long: the north part forms a mountainous peninsula, marked by an active volcano at the extremity, called Kororvinsko, and rising 4852 feet above the sea. Korovinskaia Bay, to the west, is six miles and a half broad, and affords shelter from all but northerly winds; it has two coves and an inner harbour, the entrance to which is however difficult; here is enormous quantity of fossil wood. The small island of Soleny (salt) lies to the west, and on the same coast are two good harbours; on this side is also Kourovskaia and the remarkable volcanic rock Koniouge. Mineral springs abound on this island, which everywhere bears evidence of volcanic action.

A group of small islands and rocks, named Telastie, *i.e.*, crowded, lie to the west of Atcha, and beyond those East Sitkhin, about twenty-five miles in circumference, culminates in a snowy volcanic peak, 5033 feet above the sea. Kanaga, about twenty miles long by seven broad, has also a remarkable high volcano, as has also Tanaga (which is thirty miles long by ten broad), at the south-west point, near which is a bay receiving the waters of two rivers, and affording good anchorage and shelter. Goreloy, or Burnt Island, has a circumference of about eighteen miles; some small islands also lie to the west of Tanaga.

Of the Kryci or Rat Islands, Semsopochnoi, or the Island of Seven Mountains, lies fifty miles west of Burnt Island, the strait which separates them is the most easily traversed of any of the entire chain of the Aleoutian Islands. Semsopochnoi is circular, thirty miles in circumference; the mountains do not attain to the height of perpetual congelation; it has one active volcano on

the north side. Amsthitka is about thirty miles long, comparatively low, and has only one bay, which is on the north side, and does not afford secure harbourage. Kryci, or Rat Island, from which the group takes its name, is seven miles long, and is separated from Attou, which is one of the largest of the whole chain, by a strait fifteen miles wide.

The Blijni group consists of two islands and many rocks, the name implies their nearness to Kamtschatka; of these, Agattou has a circumference of thirty-four miles, and is separated from Attou, which is one of the largest of the whole chain, by a strait fifteen miles wide.

Attou may be above forty miles in length; on the north coast is Tschitschagoff Bay, affording excellent harbourage, in lat.  $52^{\circ}56'$ , and nine miles from the east point of the island.

Behring's and Copper Islands connect the Aleoutian chain with the peninsula of Kamtschatka, and within these islands, as far as Behring's Strait, is sometimes called the Sea of Behring, and here we find commencing that which is the peculiar characteristic of the east coast of Asia,—viz., extensive seas covered by chains of islands.

## CHAPTER XLI.

### THE WESTERN COAST OF THE NORTH PACIFIC.

#### § 1. The Sea of Okhotsk.—2. The Sea of Japan.—3. The Yellow Sea.

**THE Sea of Okhotsk.**—This extensive basin lies between the 45th and 65th parallels of north latitude, and is surrounded by the peninsula of Kamtschatka on the east, the shores of Asiatic Russia, the island of Sagalin on the north and west, and the Kurile islands and Jesso on the south; it measures, from the shores of the island of Sagalin to those of Kamtschatka, 450 miles, and more than 1000 miles from Jesso to the northern coast, besides Shansarki Bay to the south-west, and the still deeper indentations of the Gulf of Ghijinsk to the north-east: it is noted for the tempestuous character of its climate, and its low northern shores are covered with ice during the winter. The water is sufficiently deep everywhere, and the navigation unimpeded.

The peninsula of Kamtschatka is about 800 miles in length, by 250 in extreme breadth, but in the narrowest part behind Karaginski Island only sixty-five. This island lies in the centre of a bay which extends for 180 miles, from Cape Gorenski, in latitude  $59^{\circ}50'$ , to Cape Ozerni, in latitude  $57^{\circ}35'$ . The southern part is known as Usinsk Bay; the shores appear to be low, but the water sufficiently deep; it receives several small rivers, among which the river Karaga, falling into the Karaginskaia Bay, may be mentioned; this offers harbourage, and the country round is well wooded. The island is fifty-eight miles long, with an average breadth of fifteen, but narrowing towards the south-west; it is mountainous, culminating about 2000 feet above the sea, the mountains rising in three distinct and parallel ranges, with deep ravines between them; the north and east sides are high and steep, the west marked by gently-rising sandy beaches; in the centre of the west side the gravel spit of Seminoff stretches seven miles to the south-west, with an average breadth of 300 yards, forming an excellent roadstead. This island has no harbour. Below Cape Ozerni is the northern mouth of the river of Kamtschatka, which has a course of about 200 miles to the north-east to the pond, from whence its two mouths separate, the one continuing for seventy-five miles its north-east course, and falling into the bay to the south of Cape Ozerni; the other and more important trending due east for sixty-five, and forming the Liman or Lake Nepitchie, about ten miles in diameter, before it enters the Gulf of Kamts-

chatka to the south; the two mouths are about sixty miles apart, but there appear to be other, or anastomosing branches between them. This river rises in a depression of the mountains near the sources of the Bolskaia, or Great River, which, however, has not so great a length by about fifty miles. The valley of the Kamtschatka is about thirty-five miles wide, and lies between the great central chains of the peninsula and the south-east volcanic range. The south-east slope is gentle, but the north-west steep. The volcanoes of the east coast are the characteristic feature of the peninsula; that of Shivelutch rises in three peaks in the centre of the triangle formed by the two mouths of the Kamtschatka River, and the peninsula surrounding Lake Nepitchie appears to be volcanic, between which and Cape Kronotski to the south the Gulf of Kamtschatka extends for seventy miles, separated from the Gulf of Kronotski by the spurs of the Kronotskaia volcano, and having the great Klocheffskaia volcano rising high above its western shore. The Klocheffskaia or Klutchevskoi volcano, so called from the springs at its base, forms a steep truncated cone about 16,000 feet in height, to the north of which rise two other flattened mountains, while a serrated ridge extends to the south; these are all covered with perpetual snow. The Kronotskaia volcano rises 10,610 feet above the sea, and is also conical; on the west slope is a considerable lake; other lofty peaks are seen in the interior, but not forming a connected range. The coast here is high and rocky, but the country well wooded. The Gulf of Kronotskoi extends for more than 100 miles; Cape Shipanski, the southern extremity, is formed by the spurs of the Jourmanov or Jupanoff volcano; as the bay to the south is limited by those of the volcano Vilutelin; this latter is conical in form, but does not much exceed 7000 feet in height. Within the bight thus formed lies Avatcha or Awatska Bay, more properly Swaatscha, which is reached by a channel four miles long and one broad, and forms an irregular basin ten miles in diameter; it contains several excellent harbours, that of Petropaulovski on the east is best known, and will receive the largest vessels; that of Rakorya, to the south, is equally excellent, but not quite so accessible; that of Tarcinski, to the south-west, is also of great size and excellence. Although the shores are in many places low, the land rises in gentle and well-wooded undulations, backed by the volcanic ridges already referred to. To the south of this bay, the most important in Kamtschatka, the coast is high and rocky, broken only by small indentations, and trending nearly south-west; to the southern extremity, Cape Lopatka, in latitude  $51^{\circ} 2' N.$ , longitude  $156^{\circ} 50' E.$ , which is low and flat, and of a form corresponding to its name, i.e. the blade-bone of a man.

Off the east coast of Kamtschatka lie the Romandovski or Governor Islands, named after Behring; these, as has already been noted, are not to be considered as a portion of the Alcutian chain, although they connect the volcanic ranges of America with those of Asia. Behring's Island, the westernmost, distant 100 miles from the coast of Kamtschatka, is about fifty miles long by fifteen broad, narrowing towards the south: a range of mountains extends through the island, rising above 2000 feet. The coasts are rocky and dangerous, and there is only a small and badly sheltered harbour on the north. Cape Manati, the southern point, is in lat  $54^{\circ} 41' N.$ , long.  $123^{\circ} 17'$ . Meduy, or Copper Island, is about thirty miles long and five wide, though in many places not more than two: there is a small harbour on the north-east. Like Behring's Island, this is rocky: on neither are trees found; but the former abounds in small rivers, the margins of which are fertile: there are not any active volcanoes on either.

The western coast of Kamtschatka is little known; it is, however, low and sandy, for twenty-five miles inland producing willow, alder, mountain ash, and birch; and broken by numerous streams, which flow from the mountains. Of these only the Bolskaia, or Bolchoireka, already mentioned, deserves the name of a river: it has two affluents about twenty-two miles from its mouth, the Gottsofka and Bistraia, and the estuary is accessible for vessels of considerable size: to the south is the Opulnaia volcano. The

coast shoals gradually, and spits of sand form small narrow gulfs parallel to the coast line, which is very regular: the principal of these is the Gulf of Chikanigitch, about 100 miles north of the Bolshaya. The principal projections of the coast line are Capes Ntkolokoki; Omigon, to the north of which the Tigel, the largest river of the north part of the peninsula, flows into the sea; and Pyati Bratski, or the Five Brothers.

The north-east angle of the Sea of Okhotsk is extended in a deep bay called Ghijinsk Igiginskoi, or Jieghinsky, of which little more is known than its general form and size; it is rectangular, and about 150 miles long by 120 wide: at the north-east extremity the Gulf of Penginsk or Pengina, stretches far into the land, and receives the waters of two considerable rivers, the Talofka or Galofka, and Penginsk or Pengina. The former is described as flowing through a well wooded country, and as having its rise in lakes; the latter as broad, but cumbered with ice heaped upon its shores; between them extend large plains covered with broom. The mountains here approach closely to the coast, and two other rivers, the Oklana and the Egatcha, fall into the head of the Gulf.

The Gulf of Penginsk is about fifty miles wide and 150 long; it is separated from another gulf, not nearly so extensive, by a peninsula of about the same width, terminating in Cape Pororatin. This gulf also receives a river at its extremity, which gives the name Ingiga, or Ghijinsk, to the whole bay; and the coast is here more broken, presenting on both sides bays, of which, however, little more than the names are known. At the south-west angle of Ghijinsk Bay is Jamskaia Bay, which also receives a river of some magnitude, and the peninsula separating it from the Sea of Okhotsk terminates in Cape Piaghin, off which lie several small islands.

The northern shore of the Sea of Okhotsk is broken in the centre by Tanok Bay, about fifty miles in width, which receives the river Toya from the west, besides other streams: its shores are low and deeply indented, as are those of the sea for seventy miles to the west, when volcanic cones begin to appear; and from thence the coast is high and rocky. At the north-west angle the River Okhotsk falls into the sea, and many other small rivers break the northern and western coast line. The junction of the Okhotsk and Kaktui forms a shallow harbour, not easily accessible, but, it is said, the best on that coast: the land surrounding it is low, marshy, and barren. On the west coast the Gulf of Aldom and Port Aian may be named; the latter a secure harbour about one mile and a-half long by one and a-quarter broad at the mouth, with sufficient water for large vessels.

At the south-west angle of the Sea of Okhotsk is Shantarski Bay, in which are the islands of the same name, and which forms three deep bays or gulfs of very irregular form. The Shantar Islands are four in number, rocky and barren; the largest, Great Shantar, is about thirty-five miles long and twenty broad, presenting an open bay to the south, and a deep cove to the north-east. Feklistoff Island, the second in importance, is about twenty-five miles long and ten broad, also having an open bay to the south: the others are unimportant. To the west of Feklistoff Island is Uaski Bay, receiving the river Uda from the south; it is about forty-five miles in extent. Tugursk Bay is about fifty miles deep, and forms at the extremity a basin, into which the Tugur discharges its waters; it is separated by an irregular rocky peninsula from the Gulf of Akademia, into which the river Usalghoi flows to the east, forming the gulf of the same name, and separated from Ulbonski Bay, which is about twenty miles deep by fifteen wide, by a low narrow spit: near the entrance of the Gulf of Akademia, on the west side, the Gulf of Konstantia affords safe harbourage. From hence an irregular coast trends east and south to Cape Romberg, in lat.  $53^{\circ} 26' N.$ , long.  $141^{\circ} 45' E.$ , the eastern limit of the Asiatic Continent.

The island, or as it was formerly considered the peninsula, of Saghalin, is remarkable not only for its great length in comparison with its breadth, the former being estimated at above 500 miles, while the latter does not exceed



sixty, but for its peculiar position at the mouth of the great River Amur, or Saghalin-ula, from which it is separated by the Liman, or Lake Amur\* or Amur, which communicates with the Sea of Okhotsk on the north, and the Gulf of Tartary on the south. This lake is about seventy-five miles long by thirty broad, and though in many parts shallow, has a narrow channel, with deep water through it, which neither Broughton nor La Perouse discovered. The Amoor flows into it on the west side, separated from the Sea of Okhotsk by a rocky peninsula about twelve miles wide: the mouth is accessible by two narrow and comparatively shallow channels, between which the great banks deposited by the stream stretch into the Liman: it opens first to the north-west for sixteen miles, flowing between rocky banks, with a breadth of four miles, the water deepening to twenty fathoms; and then bends suddenly to the south-west, forming a lake-like basin thirty-seven miles long by eight broad. The northern entrance to the Liman of the Amur is about twelve miles wide, but the channel is reduced to four; the southern entrance is only about two and a-half miles in width: both coasts are deeply indented, but present no harbourage from the shallowness of the water; but to the north, on the west coast of this island is the circular basin known as Obruan Bay. The northern extremity of Saghalin, Cape Elizabeth, is in lat.  $54^{\circ} 24' N.$ , long.  $142^{\circ} 7' E.$ , a naked mass of rock, the extremity of a spur from the mountains which extend through the island. Cape Maria, to the west, is distant about seventeen miles, which is the breadth of the island to the north. North Bay lies between these capes. The northern part of the island, though mountainous and rocky, is covered with luxuriant forests; the north-east coast is, however, dreary in its appearance, consisting entirely of granitic rocks. From Cape Klokatcheff, in lat.  $53^{\circ} 46'$ , the coast becomes low and sandy, rising in rounded hills; but at Cape Delisle de la Croyere the coast becomes again rocky, and the interior mountainous. There appear to be rivers on the coast, which, however, have not been explored.

Cape Patience, the eastern extremity of the island, is in lat.  $48^{\circ} 52' N.$ , long.  $141^{\circ} 46' E.$ ; it is low, and stretching to the south forms Patience Bay, which extends seventy miles to the west; its northern coast is mountainous and rugged, and lofty snow-capped peaks rise in the interior, excepting in one part, probably the valley of the river Neva, which debouches into the head of the Gulf. Cape Somionoff, a high promontory, is the limit of the bay on the west, to the south of which the island forms a long promontorial extension, of about thirty miles in average width for 120 or more, when dividing, it stretches north-east and south-west, surrounding an extensive sheet of water called Aniwa Bay, sixty miles across at the mouth, between Capes Siretoko and Nottoro, the Aniwa and Crillon of Vries and La Perouse. Cape Aniwa is rocky and barren, but the country at the head of the bay is beautiful and fertile, and affords abundance of the finest timber.

The eastern coast of Saghalin south of the Bay of Patience, is irregular and broken. Cape Tonin, in lat.  $46^{\circ} 50'$ , forms Mordwinoff Bay. Of the western coast of the island little is known; it appears to be broken by numerous indentations, in which, from the proximity of the mountains to the seaboard, there is no doubt deep water. Estaing Bay, under the same parallel as Cape Somionoff, is a basin six miles in diameter; and at Jonquière Bay, under the same parallel as Cape Delisle, there is good shelter from the south-west, and coal is found. Two small islands lie off Saghalin: Robben Island, noted for the dangerous reef which surrounds it, fourteen miles from Cape Patience, and Totomoseri, the Monneron of La Perouse, about 23 miles from the western coast, to the north of Cape Nottoro. Saghalin was called by the Japanese Yezo, or Jesso Uka, i.e., Northern or Great Jesso, to distinguish it from the Yezo or Jesso, with which they were well acquainted, which is separated from it by La Perouse Strait, twenty-five miles in breadth: this, with the Kurile Islands, completes the cincture of the Sea of Okhotsk, which may thus be said to be landlocked. These islands are above twenty in number, and stretch in a scattered chain from Kurile Strait, which separates Shumshu

\* See *Journal R.G.S.*, vol. xxviii., for account of the Amur.

Island from Cape Lopatka, the southern point of Kamtschatka, in lat.  $50^{\circ} 50'$  north, to Yezo Strait, which separates Kuna-siri from Yezo, in lat.  $43^{\circ} 50'$ , thus extending through five degrees of latitude and ten of longitude.

We owe our knowledge of these islands to Broughton, La Perouse, Vries, and Golownin, and the straits between the islands commemorate their names or those of their vessels. The islands owe their general appellation to the volcanoes which are found in the more northern, the same term, "smoky," being applied to the lake at the southern extremity of Kamtschatka, between the volcanoes Itterna and Kosheliova. Kurile Strait is only eight miles broad, but has deep water. Shumshu Island is low, of rectangular shape, fifteen miles long by ten broad; it is separated by Little Kurile Strait from Paramushir Island, the most important of the northern division, which is about sixty miles long and fifteen broad; it is lofty and of irregular outline; to the north-west, distant ten miles, is the little outlying island Alaid; and to the south-west, distant five, the still smaller island Shrinsky. Onnekotan is separated from Paramushir by Amphitrite Strait, nineteen miles broad; the island is near thirty miles long. The ten islands between this and Simusir are all inconsiderable, but this last deserves notice; it is twenty-seven miles long, mountainous, and has a port at the north end affording shelter to small vessels, named after Broughton. This island forms the north limit of Boussole Channel, which divides the Kurile Islands into two groups, the Russian and Japanese. Boussole Channel is nearly sixty miles wide between Capes Rollin and Itoientomo (Cape Kastriku of Golownin), the south-east and north-east extremities respectively of Sumisir and Urup. Three small islands lie in the channel; these were in mistake named by La Perouse "The Four Brothers," the northern, which is a high bare rock, is named Broughton Island; Urup, Ouraup, or Company's Island, also called by the Dutch Staaten Island, is above fifty miles in length, but only eight in extreme breadth; some rocky islets lie off the north point; Yturup, or Itouroup, by some considered the Staaten Island of the Dutch, is of very irregular form, above 130 miles in length, and exceeding twenty in extreme breadth, but narrowing in more than one place to three miles; there is a deep bay on the south-east, between Capes Nonesio and Torimoinots, which are distant from each other ten miles, and one still larger on the north-west, between Capes Itobiri, Kawoi, and Moikeri. Cape Ikabanots is the extremity of a rocky peninsula, which stretches ten miles into the sea from the north-west side of the island, on which there are several small lakes and rivers. Peco Channel, between Capes Teriko and Moimoto, eighteen miles wide, separates Yturup from Kuna-siri, which might well be considered one of the Japanese group, lying within the deep bay formed by the north-east part of Yezo. It is of irregular form, and its shores deeply indented; the eastern coast forms a slight curve, the chord of which, from Cape Moimoto to Cape Keramoiu, the south-east point, is fifty-five miles, in the centre of which a peninsula extends for four miles, forming apparently harbours on either side, which are separated from one on the west side by a distance of only one mile. Cape Moimoto is distant from Cape Rewansi, the north-west point, twelve miles, and there is a deep bay between them and a rocky islet off the east point. Cape Keramino is distant from Cape Itorin eight miles; there is a bay also between these. The island may be considered fifty-eight miles in extreme length and ten in extreme breadth, which is at the north part.

These islands are noted for the rapidity of the currents which surround them, and the fogs which envelope them; the climate is strictly maritime, and of their productions little is known.

The Gulf of Tartary, gradually widening towards the south, from the narrow channel which connects it with the Liman of the Amoor, opens in the Sea of Japan, between the Island of Yezo and the main, which are distant about forty-five miles. The east shore, formed by the Island of Saghalin, has been already noticed; of the west little can be said; its general trending is north-east and south-west, and from Cape Crillon, in lat.  $45^{\circ} 14'$ , to the entrance

of the Liman, may be 470 miles; its mean breadth may be seventy miles; the surface is unbroken by islands, excepting in the bight formed by Cape Lessops, in lat.  $49^{\circ} 30'$ , where there are two, named Blondela and Le Prisi, eighteen and seven miles in length respectively. To the north of Cape Monty, in lat.  $50^{\circ} 38'$ , there is an extensive bay, with deeply indented coast, promising harbourage, which is found in Castries Bay, in lat.  $57^{\circ} 30'$ . This basin is about two miles in diameter, and contains four small islands: its shores have also several coves.

2 *The Sea of Japan*.—This sea extends from the Strait of the Corea to La Perouse Strait, more than 700 miles from south-west to north-east, and is more than 500 miles broad in the centre. The southern part, between Mantchoo Tartary, the Corea, and Nippon, forms nearly a circle, with a diameter of about 500 miles; the northern might be considered the extension of the Gulf of Tartary, and like that gulf, its surface is unbroken, excepting by some small islands to the south: it has also steep shores and deep water everywhere.

The coast of Mantchouria and the north-east coast of the Corea are little known and less frequented; they are irregular, broken, and rocky; the country mountainous in the interior, and well wooded. The Bay of Motao, under the thirty-ninth parallel, extends for fifty miles, and contains numerous islands.

The Japanese Islands stretch for more than 1000 miles between the south point of Saghalin and the Corea; they consist of two principal, Yezo and Nippon; two smaller, Kiusiu and Sikok; besides many other islands and groups of less importance, they are mountainous, rising in volcanic peaks, some of which exceed 12,000 feet in elevation; are well watered with rivers and lakes, fertile, and well-wooded; abounding in minerals and metals, including gold and coal. These islands present two climates, the western approaching to the continental, permitting the growth of vegetables of the temperate zone, severe in winter, hot in summer; yet with the limit of perpetual congelation as low as 8000 feet in some places: the eastern, maritime, in which many of the vegetables and fruits of the tropics are found, and rice and sugar are cultivated largely; and although of course the temperature and productions vary considerably within so many degrees of latitude, yet the difference in longitude produces effects much more striking in this respect.

The Island of Yezo Jesso, *i.e.*, the Coast, or more properly Einso, from the name of the native inhabitants, is of irregular cruciform shape, extending about 300 miles from north-east to south-west, and about 200 from north to south; or it might be fancifully described as a fish, of which the coast of Yezo Strait would be the head, and the south-west extremity the tail. The north-east side extends about forty miles from Cape Soya to Cape Kamintiroka; within this distance there appears to be one bay or harbour at Sarwia; from Cape Kamintiroka it makes a wide sweep, forming an extensive but not deep bay, to Cape Siretoko, distant about 150 miles. In the bottom of the bay a lagune fifteen miles long by five wide is formed by a spit, and a harbour appears to the east of Cape Nottoro. Several streams fall from this coast, those to the east being the more considerable; Cape Siretoko, or Spangberg, is distant fifty miles from Cape Uossyam or Broughton; the eastern extremity of this island, in lat.  $43^{\circ} 38' N.$ , long.  $46^{\circ} 7' E.$ , off which are five rocky islands and numerous islets, extending for thirty miles in a north-west direction: between these capes, Yezo Strait makes a deep rectangular bend: here also a spit twelve miles long projects; and in Laxman Bay two deep indentations are found. From the east point the coast, off which are several small islands, trends west and south for 100 miles, when the deep Bay of Good Hope presents itself, forming two basins, protected to seaward by the peninsula of which Cape Horason is the extremity. From Cape Seriba, the west extremity of Good Hope Bay, the coast forms a wide bay, extending for about ninety miles to Cape Yerimo (Eroen or Evosn?) under the forty-second parallel; on the eastern side of this bay two rivers, the Kasuru and Alcanbets, bear the

surplus waters of two considerable lakes to the sea: these lakes lie among the volcanic peaks of the north-east of the island, of which, in that part, Atosya, Akani, and Matsunesiri are the most prominent. To the west of Cape Yerimo the coast trends north and west, and then bending to the south-west, projects in the irregular promontory of Cape Yetomo, distant from Cape Yerimo seventy-five miles; beyond this is the circular basin called by Broughton Volcano Bay, thirty miles in diameter, the bottom of which is not, probably, more than twenty miles distant from the north-west coast of the island; a glowing description of the beauty and fertility of the country round the bay is given by that navigator. To the south is a triangular extension, terminating east and west in Capes Yesan and Sirakami, or Nadjiedja, the southern point of the island, in lat.  $41^{\circ} 21' N.$ , long.  $140^{\circ} 9' E.$ , having Kakodadi Bay—a secure harbour six miles across, formed by a peninsula three and a-half miles long—between them. These two capes form the limits of the Strait of Sangar, which separates Yezo from Nipon, and is twenty miles broad at the western, and thirty at the eastern entrance.

The western coast of Yezo extends in an irregular undulating line to the north for above 100 miles to Cape Simawoi: about fifteen miles from this coast lies the small triangular island Okosiri, about fifteen miles long and ten broad; the still smaller islands Usimra and Kusimra are placed respectively thirty and ten miles from the southern part. To the north, between Capes Simawoi and Wofui, Stroganoff Bay extends for forty miles, receiving the water of the largest river of the island, Isikari, which, rising in the centre of the island, may have a course exceeding 150 miles, and receives from the right an affluent which makes its course, parallel to the west coast of the island, for about forty miles, at an average distance of fifteen miles, throughout which the coast is steep. To the north of Cape Wofui the coast forms two arms, terminating in Capes Tornamoi and Isya, distant respectively about forty miles. Ten miles distant from the former are two small islands, and about the same distance from the latter, Risiri, the Langle of La Perouse, about ten miles in diameter: and the same distance beyond it, Refunsiri, which is rather larger. To the south of Cape Isya another considerable river falls into the sea. The northern extremity of the island forms a bay, called Romanzov, between Capes Nossyab and Soya, which are distant about twelve miles. The latter, the north point of the island, is in lat.  $45^{\circ} 31' N.$ , long.  $141^{\circ} 51' E.$ , and is distant from Cape Nottoro, the south point of Saghalin, thirty miles.

A volcanic band appears to run through this island from Cape Siretoko to the western coast; many of the peaks are lofty, but their elevation is not ascertained: even the names differ so much in different accounts, that identity is impossible; but the Saddle Mountain, near Kakodadi, exceeds 3000 feet in elevation, and it is probable that many exceed 5000, and some 10,000 feet, since the Pic de Langle, in the island of the same name, is estimated as exceeding 5000.

The Island of Nipon, or Nippon, gives its name, which it derives from the sun, to the whole archipelago, of which it is the largest; its western side forms an irregular arc, 600 miles from north-east to south-west; while its south and east sides are respectively about 400 miles long; and in the centre, where it is broadest, it does not exceed 200 miles from Cape King to Cape Noto, the extreme points north and south; while towards the north the breadth decreases to seventy-five, and to the west to sixty miles. The northern extremity of this island is formed by two peninsulas, enclosing the double Bay of Awomori; the western bay, opposite the entrance, being twenty miles long by seven broad; and the eastern, or inner, twenty miles long by as many in extreme breadth; the entrance is about seven miles wide. The eastern peninsula is triangular, having its sides about twenty-five miles long, and terminating in Cape Toriwisaki, the most northern point of the island, twelve miles south of Cape Siwokulu in Yezo. Both peninsulas present elevated though insulated masses, on the north-east culminating 3200 feet above the sea: the land round the Bay of Awomori being flat, and in many parts

marshy. Twenty miles to the south of the bay a mountain range commences, which, running nearly north and south, divides the island for about 150 miles, and presents numerous elevated peaks, and giving rise to the Akita and Sakuda Gawa rivers; the latter of which is the largest, and may have an irregular course exceeding 100 miles, through a country presenting some considerable elevations. On the east the Figami Gawa rises among detached mountains, and flows for more than 100 miles parallel to the mountain chain already noticed; in the lower part of its course it flows through level marshy land. To the south of the mountains, under the thirty-eighth parallel, level land appears across the whole breadth of the island, broken only by some detached hills; and here the Sugawa rises from a lake about ten miles long, and receiving the Datami Gawa from the left, flows in a broad stream for about eighty miles to the sea, through low marshy lands; while to the west the Suiano Gawa, rising in the centre of the island, flows through the same marshy plain after a course exceeding 180 miles. The mouths of these rivers are covered with islands, probably formed by the deposit from their waters. To the east, the Tene Gawa and other streams falling from the opposite slopes of the same watershed as the rivers already named, unite in a network of canals and lakes, and find their way to the sea by two channels; the eastern, called the Sassa Gawa, about seventy miles to the north of Cape King, the south-east point of the island, and the western, called the Toda Gawa, into the Bay of Yeddo. These drain a semicircular plain, fifty miles in diameter. Of the height of the mountains in the centre we know nothing; but it may be conjectured that they are not of very considerable elevation, for further west the valleys of the Frine Gawa to the north, and another smaller river to the south, stretch across the island; and though to the west of the former there appears a range of some elevation, yet the greater portion of the country seems low and marshy; and still further west a deep gulf stretches from the south to within thirty miles of the northern coast, and within twenty of Lake Biwano-oumi, which is only twelve miles distant from the northern shore, is thirty-five miles long, and approaches within thirty miles of the Bay of Amagasoky, into which it discharges its surplus waters. The western extremity of the island is low, but also presents detached eminences, giving rise to several rivers, but none of course of any size.

The eastern coasts of this island are for the most part low and marshy, forming numerous indentations and bays; some, as those of Nambo and Usima, of considerable extent, the former being about ten miles wide and the latter seven, both containing islands. At the mouth of the River Figami lies the island of the same name, thirty-five miles by twelve in extreme length and breadth, with very irregular and indented coasts. Several small islands lie off to the east, and to the south Kuskoa Sau, and some smaller islets; to the west is the Bay of Sanday, twenty miles wide and as many deep, and containing several islands, the principal of which are Tazioro and Nagafama. Within Cape Kennis, and in the river Samagawa, to the south of Cape Kona, under the thirty-seventh parallel, deep inlets appear, as also at the mouth of the river Nawagawa; but of the value of these little can be said.

At the south-east angle of the island is the Bay and harbour of Yeddo; the former extending in breadth sixty miles from east to west, from Cape King to Cape Idsui, and more than forty miles in depth, the latter forming a land-locked basin twenty miles in diameter, but said to be very shallow, which is approached by a strait twenty miles long and about eight broad, the entrance being on the east side of the outer bay, which is called by Krusenstern Odawara Bay. From the centre of the outer bay, a range of small islands, known as the Brisees, or Broken Islands, stretches to the south; these are volcanic; the second, named after Vries, is about five miles in diameter; Fiat-sizin, the most southern but one, twelve miles long; the others small; the most southern small isle is in lat.  $32^{\circ} 30'$ : they are about twelve in number, besides islets, extend for 150 miles, and are from ten to forty miles distant from each other.

Cape Idsui is the extremity of a peninsula thirty miles long by fifteen wide, from which the volcanic snow-covered cone of Mount Fusi rises more than 10,000 feet above the sea; it separates the Bay of Yeddo from another extensive gulf to the west, which is about thirty-five miles deep, and thirty broad at the mouth; and about sixty miles further west is the still more extensive gulf already alluded to: it receives the water of two rivers at the extremity, at the mouths of which are several islands, probably deltic, Kando, the most southern, being about eight miles long; from the southern point of which the gulf stretches forty miles to the mouth, with an average breadth of eighteen, but forming at the east another bay, the entrance of which is ten miles wide, and situated immediately behind Cape Irako Saki, the south-eastern extremity of both bays, which is distant from Moukari Island, the south-western limit of the larger, only twelve miles. From this gulf a very irregular coast stretches south and west to the southern point of the island, off which is the small island, Oosima, about five miles in length. From hence the coast stretches north and west for fifty miles, and north and east for forty, and forming the deep Bay of Avasima, in which lies the island of the same name, terminating in a smaller bay leading to the harbours of Amagasaky and Oosaka, within the mouths of the rivers already mentioned, by which the waters of Lake Biwano are united with the sea; the mouths of these rivers are not, however, accessible to large vessels. From hence the coast trends westward for 200 miles, and on the bight thus formed lies the Island of Sikok, separated from Avasima by a narrow strait about five miles wide, obstructed by several islands, and both difficult and dangerous from the violence of the currents which flow through the narrow channels thus formed. Avasima is mountainous, triangular in shape, thirty miles long and fifteen broad.

King Channel separates Sikok from Nipon; on the east, in the narrowest part, between Capes Awa and Sira-saki, it is ten miles broad; from the former to the south point of Avasima is about twenty miles; while from the north coast of that island to the small island at the entrance of the great Bay Suwonada, a distance of 200 miles, the breadth of the northern or minor channel varies from eight to thirty miles. The Bay or sea of Suwonada is formed by the shores of the Island of Kiuisu, which here approach so closely to those of Nipon as to leave only a very narrow entrance into it from the west; it is about twenty miles wide at the entrance, and within about thirty in diameter.

The north-west coasts of Nipon differ from the southern: they are covered with reefs, rocks, and islets, in some places rising high, as at Cape Louisa 1800 feet, above the sea; here the bays of Tamada and Oo-oura may be mentioned, also a land-locked basin to the west, and the Gulfs of Motuye and Yonoko to the east of Cape Itsuomo; the former being twenty miles deep by eight in breadth, the latter twelve by four, and access being obtained to both by the same entrance, which is about two miles wide, formed by two projecting peninsulas, the one covering the latter lying at the bottom of a bay ten miles wide, the other stretching eastward for nearly forty miles, off which, at ten miles' distance lie the Oki Islands, extending fifty miles from north-east to south-west, and twenty-five from north-west to south-east, and culminating 300 feet above the sea.

From hence the coast trends east for 150 miles, it is deeply indented, and here the bays at the mouth of the River Karou-gawa at Wakasa and Kobama may be noticed, also a deep bay to the east of Cape Tati Yissi, which forms the east angle of the coast, and approaches within twelve miles of Lake Biwano; from hence the coast trends north and west for more than 100 miles, and here several deep inlets present themselves,—Daisiooz Bay, that at the mouth of Alaka-gawa River, Minato Bay, Moto-gawa Bay, and Fakuura Bay, to the north of which a promontory stretches north and west to Cape Noto, where the hills on the coast gradually rise from 800 to 2000 feet, terminating in 700 at the Cape itself, within which is Samaura Bay, a deep inlet containing a considerable island, to the east of which is Toyama Bay, fifteen miles in extent, which receives the waters of two rivers, the mouths as usual forming

deltic islands. From Cape Yetsiu, the eastern limit of this bay, the coast trends north-east, north, and north-east, to the extremity of the island, 300 miles; here Takala Bay may be named, and the islands of the delta of the Sinano and Ditami Rivers, forming numerous channels, and Lakes Niegata and Toregane, and extending for thirty-five miles, off which lie the Sadi Islands, two in number, the inner being mountainous, and culminating 4500 feet above the sea, the outer, separated from it by a strait fifteen miles wide, forty-five miles long, by twenty broad, having on the south the land-locked basin of Sawami Bay, eight miles in diameter, and rising in the centre in high mountains.

Beyond these islands, to the north, the coast is more regular, though having Awa Sima Island off its southern part, and broken by the mouth of the River Sakada and by Kara Matusake and Minata Bays, the latter receiving the waters of a river which rises from Lake Fatsirugata, distant about thirty miles from the coast. To the north of Minata Bay is an islet twenty miles deep and five wide, but of irregular form, approached by a strait five miles long by about one in breadth, both formed by the Peninsula of Ogasima, the coasts of which are curves having chords respectively of twenty and twenty-five miles in length, attached to the land by an isthmus not more than two miles wide, but ten miles wide at the extremity, and forming a semicircular bend to the north; at the south of a bay extending forty miles to Cape Hokiri, the north-west angle of the island, from whence, to Cape Tatsupi-saki, the west entrance of Tsugar Strait, is fifty miles, and from that to Cape Sirikani, the opposite point of Yezo, twelve miles. This strait opens to the south in Awomori Bay, and to the north in Hakodadi Bay.

The Island of Sikok is of rectangular form, about 130 miles long by fifty broad; on the east, the rivers Tosang-gawa and Nanga-gawa fall into King Channel: the mouth of the former is covered by deltic islands, and opens in a bay ten miles deep and five wide; and from thence to Cape Awa, a group of islets cover the coast. The southern coast is deeply indented, especially to the east, presenting several bays and islands, of which Kabouto-oura may be the most important; to the east of which a peninsula extends to the south twenty miles, terminating in Cape Muradono-saki. Further west is the deep Gulf of Takatsi, enclosing the island of the same name, and beyond this the River Yetsitsu falls into another gulf forming two bays, covered by the Peninsula Kouatoumsaki, and near the south extremity of the island, Cape Tosa, another river falls into the sea. The western coast presents deep bays, formed by projecting tongues of land, and has several islands off it; of the former, the most worthy of notice is that of Misaki, which extends for twenty miles, with a breadth not exceeding two, and approaching within ten miles of the little island Takesima, which lies close to the peninsula of which Cape Boungo is the north extremity. Misaki Point forms with Cape Oogakino, to the south, a deep bay, ten miles wide at the mouth, and several small bays indent both sides of the peninsulas, of which Mikino Bay, to the north-west of Misaki Point, is the most important. From hence to Cape Yemafar the coast trends north-west comparatively unbroken, but having several islands off it, of which Okoey may be noticed as lying in mid-channel between the Sikok and Nipon. There is a small bay to the east of Cape Yemafar, and more easterly one extending for twenty-five miles; beyond this the coast is more broken, as is the north-east side, off which lies the island of Sioodoo Sima.

Sikok, although for the most part low, has several mountains of considerable elevation, which lie in a semicircular arc, extending from the east coast between the mouths of the two principal rivers, to the south-west part of the island; the south extremity, Cape Tosa, is high, but the land sinks behind it, and the bays on the west coast open in level valleys surrounded by steep mountains, at least, this is the description given of Semitsououra Bay and Kenti Bay, behind the Island of Oki, to the north-west of Cape Tosa; the rivers appear to flow for nearly their entire length through wide and level valleys.

The island of Kinsiu, as that hitherto most accessible to Europeans, is better known than the others in this Archipelago, but its very irregular form makes its description difficult; and indeed the outline, especially to the north-west, is in many parts very uncertain: its extreme length is about 180 miles, its extreme breadth 120; a range of lofty mountains extends through its entire length from north to south; its rivers, though numerous, are small, the largest, that of Saga, being scarcely fifty miles in length, and the quantity of level surface much less in proportion to its size than in the other islands. The bays and harbours on the coasts are too numerous to mention. At the north-east angle is one covered by the island, Fine-sima; to the north of Cape Boungo is Feriode Bay, fifteen miles deep, and at the south another bay nearly as extensive; and the west coast of the Boungo Channel is, like the east, formed by several projecting tongues of land; near the entrance, which is seventy miles wide from Cape Tosa, lies the Gulf of Nob-ioka, inclosing the island of the same name; and further south a deep inlet, near Chirikoff, receiving a small river. The estuaries of Rasugawa and Tutsi-garo rivers may also be noticed; and to the north of Cape Nagacff, Oosumi Bay, fifteen miles broad and as many deep, in which is the small island, Birro-sima. A peninsula, thirty miles long and fifteen broad, terminating in Cape Tchichagoff, separates this bay from the Gulf of Kagosima, which is about thirty miles deep and eight broad at the entrance, forming a circular basin at the extremity, the area of which is nearly filled by the island Sakura; this has a lofty hill in the centre, and the bay is marked by Mount Mitake, rising on the east side, as the lofty cone of Mount Horner marks the western point of the entrance to the gulf. This bay, the country round which is described as beautiful, fertile, and well-wooded, opens into Van Dieman's Strait, formed by several small islands, of which the largest and most easterly, Tanega-sima, is about eighteen miles long, level, and covered with trees; from this, Take, Iwoga and Kero stretch to the west; these are volcanic and lofty, rising more than 2000 feet above the sea, as does Yarabu-sima to the south; while Motorni, between that island and Tanega, attains an altitude of nearly 6000 feet; from these a chain of islets and rocks stretches to the Loochoo Islands, forming the eastern part of the cincture of the Yellow Sea. From Cape Rono, the south-west extremity of the island, the coast trends north, forming a deep bay, and beyond, the entrance of the Gulf of Simabara or Saga, extends for fifty miles, within which lies the Island of Amakera, eighteen miles long, and several other islands, and across which from the north-west the Peninsula of Simabara stretches, twenty-five miles long, fourteen broad, and attached to the land by an isthmus about three miles wide, and forming deep bays to the north-east and south-west. This peninsula is marked by the volcano Wiugendake, or "Peak of Hot Springs," which created great devastations by an eruption in 1792, and is still in constant action; its elevation is 4110 feet. Within this the Gulf of Saga extends for thirty miles in depth and about twenty in width, receiving at its extremity the largest river of the island, besides some smaller streams.

From the isthmus which attaches the Peninsula of Simabara to the land, a similar isthmus joins it to that of Nagasaki, which extends north and south for thirty-five miles, with an average breadth of ten. Between these peninsulas is a bay extending twenty miles, with the small island, Kaba-sima, near the south-west point, whence the land extends westward for eight miles to Cape Nomo, to the north of which lies the Bay of Nagasaki. Cape Nomo is marked by a hill cleft in the summit, and from it the mountains gradually increase in height round the Bay of Nagasaki. Several islands lie off the coast, some rocky, others covered with wood from the base to the top. The harbour of Nagasaki is one of the best in the world, the islands which cover its entrance forming safe roads, and the inner harbour being quite landlocked; this is about five miles long by two broad, with depth of water for the largest vessels, and soft, oozy bottom. The northern extension of the peninsula covers a deep gulf twenty-five miles long by eight broad, having



the island Koura at its entrance, and beyond an irregular coast trends to the north and west, until with the south extremity of Nipon it forms a deep bay, connected with Suwonada Bay by the narrow strait already mentioned, and having Fiki and other islands within it. This coast and the western part of Nipon are covered by a chain of numerous islets, recently surveyed by Mr. Richards, which range from 300 to 800 feet in elevation; at the south extremity of the chain are four or five larger than the rest, one of which obtained the name Harbour Island, from Port Lindsey at its southern extremity. Beyond these lie the Gotto Islands, covering an area of sixty miles in length and ten in breadth, and forming the east limit of the archipelago. The south point, Cape Gotto, is distant from Cape Nomo forty-five miles, and from Quelpart Island more than 100; as the name implies, they consist of five principal, with numerous islets, especially to the north. About thirty-five miles to the south of these islands, a group of lofty rocks rise out of the sea; and twenty miles from the south-west coast of Kinsiu lie the Koski Islands, the largest of which is ten miles long, the second about five, and the others mere rocks; and at the distance of eight, twenty-five, and twenty-two miles respectively are Tsukurase, Roche-Ponce, and Ingersoll rock, which unite the northern chain with that forming the southern limit of Van Dieman's Strait. Roche-Ponce Island is 1050 feet high.

In the centre of the Strait of the Corea lie the islands Tsus-sima and Tutelin, separated by a very narrow strait, and occupying an area thirty-eight miles in length and twelve in breadth; a chain of lofty hills runs through the whole length, opening to the east and west in fertile valleys; the coasts are much indented. They are distant from the Gotto Islands thirty-five, and from the Corea thirty miles.

The Peninsula of the Corea is above 300 miles long, and from 100 to 150 broad; it is for the most part low, but rising to the north, and on the north-east, mountains 6000 feet in height approach the coast; of these, Cape Ducos forms the south-east extension, in lat.  $38^{\circ} 10'$ ; they extend round the west and north sides of the Sea of Japan, and in Mount Hienfoung attain an elevation exceeding 8000 feet. The coasts, which are lofty, rise in Cape Bruat, near the 43rd parallel, 1500 feet above the sea. Of the bays, those of Broughton and Yong Hing may be mentioned in the centre, and that of Pinghai, in which are the small islands Fan-ling and Telian-shan. Cape Clonura, nearly under the 38th parallel, terminates the Strait of the Corea to the north-east, and from it the southern coast of the peninsula extends south and west 175 miles; it is much indented; Chusan harbour, seven miles deep and about two wide, terminating in a beautiful sandy bay, opens on the north point of Tsus-sima Island; farther west the coast is covered with islands which form an archipelago between the Corea and Quelpart Island, shutting in the entrance to the Yellow Sea, into which they extend, and cover 150 miles of the west coast of the peninsula.

3 *The Yellow Sea*.—If this sea be, as is usual, estimated as within a line drawn from the Corea to Chusan Island, it will extend about 350 miles in breadth, and as many in depth, to the peninsula which covers the entrance of the Gulf of Pechelee, while that gulf and the Gulf of Leotung extend from north-east to south-west about 250 miles, and from east to west 180. The characteristic of this basin is its comparative shallowness and muddy bottom, and, receiving as it does the deposit from the waters of two of the largest rivers in the world, as well as many smaller, this may be expected to increase.

The line of islands extending from Quelpart to Formosa would, however, seem to indicate that this basin should have a larger area, and that its cincture to the east must be looked for in them: and within these limits its extent would be 900 miles from north to south, and 700 from east to west; an area less important, probably, from its extent, than from the greatness and variety of the interests centred in it.

Quelpart Island, the east limit of this sea, may be considered the south of the Corean Archipelago; for although apparently detached, the presence of

rocks and shoals, and decrease of depth in the water, indicate their connexion; it is about forty miles long by twenty-five broad, lofty, well-wooded, and fertile; and the southern islands of the Corean chain are of similar character. The coast of the Corea is little known, but Chui-yieng or Basil's Bay is fit for small vessels, as Gankeang or Marjoribanks Harbour, formed by Amherst and other islands, is for those of the largest size. Here the river Ya-lu-kiang joins the sea: it is navigable for twenty-two miles, and beyond this, in Sir James Hall's group under the thirty-eighth parallel, there is also good anchorage.

The long slope of the Corea being to the west, several rivers fall into the Yellow Sea from this side; and, although the climate is severe in winter, the valleys of the Corea may be noted for their fertility. The orange, citron, mulberry, and grape are found in abundance in a wild state, and fir timber is plentiful and of fine quality: copper also is found, as are gold, silver, iron, and coal. Animal life, both on land and water, is varied and abundant; whales and seals multiply on the shores; caymans and serpents of great size are found in and upon the banks of the rivers. Horses, deer, oxen, wild boars, panthers, and fur-bearing animals, with water-fowl and game, sufficiently attest the natural richness of this peninsula.

The north-east portion of the Yellow Sea, the Gulf of Leo-tung, is little known; its shallowness, the severity of the climate, the intricacy of the navigation, and the poverty of the inhabitants, presenting barriers to the extension of commerce into it; it may have an extent of 100 miles in either direction; its eastern coast is, like that of the Corea, covered with rocky islands: the water deepens towards the western coast, and here the hills approach the shore.

The Gulf of Pechelee is better known; it is formed by the projection of the peninsula Shang-tung, the extremity of which is in lat.  $37^{\circ} 23' N.$ ,  $122^{\circ} 45' E.$  Off this point is Alceste Island, and to the north, the Mei-tao, or Black Islands, form, with the continental shore, a strait of the same name.

Under the parallel  $37^{\circ} 30'$ , the Island Leu-chung-tow covers a deep bight, and forms an excellent harbour: and seventy-six miles from the north-east of Shang-tung, and to the south of the bold headland Che-fow-tao, is the harbour of the same name, also known as Ki-san-seu Bay, which, though covered by a group of islands, does not afford secure harbourage. Seven miles to the north-east lie the Cung-cung-tao Islands, two miles and a-half only from the land; and thirty-six miles from Che-fow-tao, is Yang-chow-foo, a harbour of some importance, though not of great natural capabilities. Numerous islands lie off these and the other harbours of this coast, and extend in the Sha-loo-poo-tien Islands. Towards the Gulf of Leo-tung Leu-chow-foo is a port at the mouth of a river on the south side of the gulf, marked by bold cliffs. The Pei-ho, or White River, though flowing through a bold country, is remarkable for the level surface of its channel: at a few miles from the sea, it is only half-a-mile wide; it is navigable for nearly 100 miles, to Tong-chow-foo. The junction of the Eu-ho or Yun-liang-ho, with the Pei-ho, forms the Ta-kao, or Great Mouth; this is obstructed by a bar nearly dry at low water. To the north and east, distant about twenty miles, are the Sha-loo-poo-tien Islands, or, as the name implies, Thunder and Lightning Sands.

The Whang-ho, or Yellow River, has, from the colour of its waters, the same name as the sea; it has already been described as a deep, rapid, turbulent stream, offering few advantages for navigation; its principal mouth is narrow, but it enters the sea by several, none of which are much known. Between this river and the Yang-tse-kiang is a vast alluvial deposit, extending 150 miles along the coast, from which shoals project for fifty miles to seaward. The mouth of this river forms a triangular bay, presenting a base of sixty miles to the sea; on the south side is the Island of Taun-ming, fifteen miles long by five broad, which is also low, and of alluvial formation. Within the channel formed by this island and the main is the inlet of Woo-sung, or Shanghai, eighteen miles from Cape Yang-tse. This inlet or

river is about half-a-mile wide, but has not deep water for large ships within five miles of the port of Shanghai. The fresh water of the Yang-tse-kiang is often perceptible out of sight of land. Hang-chow Bay opens to the south of the Great River, extending about sixty miles from Yang-tse Point to Chusan Point; on the northern side is the harbour of Cha-poo, which, though shallow, is thought superior to many on the coast. Here the land is still low, but rises in the interior into undulating and hilly country. The true mouth of the river Tchín-tang is eighty miles from Cape Yang-tse; Chusan Island, giving name to a small archipelago, lies near the southern entrance. This island is twenty miles long by ten broad; it has four ports—Ting-hae, Ching-kea-mun, Ching-keang, and Shaavu. The first is difficult of entrance, from the rapidity of the tide among the islands which cover it. The second may be noted for its fisheries: the harbour, covered by the Island Lokea, is good, though small. The Chusan Archipelago is rocky—rising 500 feet above the sea. Ching-hae and Ning-po are situated on a creek, to the south of Chusan; of these, the latter is the port; and they are eleven miles distant by the river, which is shallow and about two-thirds of a mile in width. To the south is Nimrod Sound: here the coast partakes of the elevated character of the Chusan group. Nimrod Point being high, the sound is thirty miles deep by two and a-half broad. The principal entrance to the south of Lu-whang Island being ten miles broad; the south face of this island has two deep indentations with sandy bays; it is about ten miles long and six broad, and rising in peaks, the highest of which exceeds 900 feet.

Shei-poo Harbour to the south forms an extensive basin at high water, but at low tide dwindles to a narrow channel; it is covered by Tung-mung Island, and is connected with San-moon Bay to the west; off it are the Kweshan Islands, eleven in number; the largest is three miles long, and rises 500 feet above the sea; its coast is steep, with high cliffs. On the main the hills rise 1000 feet abruptly from the sea, and off it are numerous small islands. San-moon Bay extends twenty-five miles, and to the south is another wide opening, into which the River Tai-chow is discharged. Similar in character is Wan-chew Bay, having Great Samp-wan Island to the north, and Wan-chew River to the west; this river is not navigable for vessels of burden. To the south lie Pi-quan and Nam-quan Harbours; the latter with a tortuous channel for more than fifteen miles and deep water, the former open to the south-west with only fifteen feet. The country here is lofty, and very irregular in outline, and well marked by the Peak of Pi-quan. Sam-sah Inlet is one mile and three-quarters wide, and about twenty deep; and to the south, another gulf, ten miles deep, opens. More southerly still, is the entrance of the River Min. This river presents a narrow, difficult, and changing channel, trending southward for about ten miles, and then westward for about as many more, to Fou-chow-fou. The land here rises 2000 feet above the sea, and the islands, which form a belt about twenty-five miles from the coast, are all lofty and of well-marked forms. Hae-tan Island forms with the main the strait of that name: the island is of irregular shape, and about fifteen miles long; to the south is the Hung-wha Channel and Sound, receiving the river of the same name. The coast here is very much indented, but Matheson Harbour is not well sheltered, and Chin-chew Harbour is shallow. The most important inlet of this coast is Hooe-tow Bay, which extends to the south in Amoy Harbour, from which it is divided by Quemoy Island. At the entrance of the harbour are six islands, of which Tae-tan is the highest, rising in a conical peak; under this island is the principal anchorage, the water within being shallow, and after encompassing Amoy Island, forms Lung-seu Bay, seven miles in depth. This bay offers shelter for any number of vessels. The coast to the south is marked by the Pagoda of Nantai, 1720 feet above the sea. Ton-sang Harbour is one of the best on the coast of China, and marked by a saddle-shaped hill, rising 930 feet above the sea; the east side of the entrance is steep to, but the banks within are shoal. Several isolated peaks mark this coast; none, however, reaching 1000 feet in height. Owick Bay and Chauan

Bay are good anchorages, but partially exposed; southward are Hau-hae-mun and Tungas Rivers; Hicchachin Bay extending twenty miles, and Hang-hai Bay still farther south, forty miles wide; on the north side of which is Tysami Inlet; the channel is 200 yards wide, but shallow. Tysami Mound, an artificial cone, on the hills to the south-east of Hang-hai Bay, is 960 feet above the sea.

Numerous islands lie off this coast, rising about 300 feet; and at the west point of Bias Bay the hills on the main attain an elevation of 2800 feet. The south point of this bay is an irregular peninsula, forming on the north Typoong Harbour, which is covered by Lokaup Island, and affords secure anchorage. On the north of Bias Bay is Fan-lo-kong Harbour, the entrance to which is one mile and a-half wide; it is about six miles long, and deep enough for large vessels. This bay is studded with islands, and Pedro Blanco Island lies twenty-five miles east of its north point.

The beautiful island of Formosa, called by the Chinese Tai-wan, is about 200 miles in length and sixty in breadth, of an oval form, and separated from the mainland by a strait, eighty miles wide in its narrowest, and 150 in its broadest part. A range of mountains runs through the entire length of the island; to the south-east these appear volcanic; one volcano, fifteen miles from the coast, rises 1850 feet above the sea, and the other peaks do not probably exceed 2500; in the centre, however, Mount Morrison rises 10,800 feet, and towards the north the greatest elevation is above 12,000 feet; many of the peaks are covered with perpetual snow, and the east side of the island is generally mountainous and the coast precipitous; on the west, however, an undulating plain extends from the mountains to the sea, the soil of which is abundantly fertile, and produces with most tropical fruits those common to temperate regions. The island abounds in timber, and one of its chief products is sulphur.

The coast of Formosa is seldom visited, as it lies in the centre of the district of typhoons. The west coast has inlets, but they are covered by sand banks, Tyowan Harbour, at the south, only admitting small vessels; at the north-west is Tamsin Harbour; and at the extreme north, Kelong or Killon Harbour, of which the outer bay is spacious, but the inner has only three fathoms of water over the reefs which cross the entrance. The east coast is rocky, and comparatively unbroken. Formosa Channel, between the island and the Pescadore and Formosa banks, is about forty miles wide, while the Pescadore Channel between those islands and the main is 110. This group consists of several islands, mostly united by reefs; the largest of which is named Ponghou or Pehoe; it has a harbour to the west, between it and Fisher's Island, extending six miles long by two broad; many small islands lie off the west coast of Formosa.

The east side of Formosa is remarkable for a volcano, seen in 1853 in active operation, fifteen miles to sea. On this side, also, the Miacosima Islands form in two groups, of which the western is 100 miles from Formosa, and consists of two principal islands, Kokien and Patchung, the former twelve miles long by ten broad, the latter twenty by ten, the strait between being six miles wide; and some smaller islands, extending thirty-five miles, with a navigable channel between them; in the former is Port Cockburn, and in the latter Ports Haddington and Providence. The north-east group consists of the island Typing and some small islets; it is fifty miles distant from the other. Typing is triangular, having a base of fifteen miles. Off the reefs to the north, Broughton was wrecked in the *Providence* in 1797. Twenty miles to the south lies the solitary island Ysima.

The Leucheu or Luchu Islands are distant from Typing 150 miles, and 420 miles from the main, measured from Koomisang, a small island lying forty-five miles to the west of Great Luchu. This island is sixty miles long and twelve broad. The northern end is high, bold, and well wooded, the north-east abrupt and barren, the south-east low, the south, south-west, and west of moderate elevation and very fertile. Napa-kiang Road on the south-west, and

Port Melville on the north-west, are the principal ports ; both are protected by reefs, as is also the deep inlet called Barrow's Bay ; on the east side, and to the south-east, shoals and reefs cover the coast. Port Melville is separated by a rocky peninsula from Deep Bay, so called from the depth of water. A chain of islets and reefs unites Luchu to the Japan Islands, from which it is distant 300 miles.

## CHAPTER XLII.

### THE CHINA SEA AND ISLANDS.

§ 1. The east coast.—2. The islands.—3. Borneo.—4. The volcanic belt.\*

**THE China Sea.**—This extensive sea is formed on the west by the coast of China, and on the east by Borneo and the Philippines, while its southern limits are the islands of Sumatra, Banca, and Billiton, to the south of the Equator, and its northern, Formosa and the district of Fokein, under the twenty-second parallel N.L. As the eastern cincture is marked by the irregular coast of its islands, so, correspondingly, the west is by two deep gulfs, viz., those of Siam and Tonkin ; these are separated by the peninsula of Cochin China, 400 miles in length, and about the same breadth, and bounded to the south and west by the Malay Peninsula, stretching south and east 600 miles, covered by the large island of Sumatra to the south. This sea is characterized by the shallowness of its water, its numerous banks and shoals, and by groups of small islets to the south, where fifty fathoms is the extreme depth ; in the Gulf of Siam it is not so deep, nor does it exceed that depth in the Gulf of Tonkin ; indeed, the south extremity of the peninsula of Cochin China is one vast alluvial deposit. The entire length of this sea is 1600 miles, its breadth in the centre 500 miles, and from Palawan to the head of the Gulf of Tonkin 900 miles, and nearly as much from the coast of Borneo to the head of the Gulf of Siam.

The north-west coast of the China Sea forms a series of irregular curves, more or less indented to Canton River ; of these, the principal are Hie-che-chin, Hong-hai, Bias, and Mirs Bays. The former is extensive, but open to the south ; it is shallow and with a muddy bottom. The anchorage of Tenguen, near the eastern point, and the land surrounding the great bay, is covered by the rocky island Kemsue ; there are here numerous rocks, and indentations spacious enough but too shallow to form good harbours. Hong-hai Bay is also large, its surface dotted with islets, of which Hong-hai, in the centre, is the largest ; it has a harbour, Tysammu, of moderate depth and capacity, on the east side. This bay is also shallow and open to the south-west. Pyramid Point, the south extremity of Lokaup Island, marks the entrance of a deep and safe harbour, called Bias Bay or Tyloso ; between this point and Woong-mon Island the entrance is three miles wide ; the harbour is nine miles deep and four and a-half broad, with ten fathoms at the entrance, but shoaling towards the shore, which is formed on the north and east by high lands, and on the south by islands which separate it from Typoong Harbour. This harbour lies to the east of Mirs Bay ; it is double, the outer affording good and safe anchorage for large vessels, the inner, only fit for small craft and boats. Mirs Bay, the Ty-po Bay of the Chinese, is extensive, and affords good anchorage, but is open to the south and west ; its water is deeper than the others already named, having ten fathoms near the east shore, which is bold ; the entrance is five miles wide, but divided by a rock near the centre. Of the whole length of this coast are numerous islets.

\* See Crawford's *Indian Archipelago*.

The Canton River is in extreme breadth across the mouth nearly sixty miles, but carries only nine fathoms water in the entrance, which is divided into one broad and one narrow channel by the triangular island of Macao, called by the Chinese Gaow or Osmoon, which terminates to the south in a high peninsula, on which the town of the same name is built; it is about thirty-five miles long and fifteen broad. Several small islands lie off to the south-east, and others are continuous to the north-west, up the channel of the river. The south-west side of the island forms with the main a bay at the mouth of the Typa passage, and the harbour of Macao is formed by the peninsula and the island Tweelien; it is large, deep, and safe. Lintin Island and shoal lie to the east of the main channel; the entrance to which is between Macao Island and the Grand Ladrone, which are twelve miles apart; this is a long, narrow, and lofty island, about fifteen miles long. To the east of Lintin is the Fan-sheek Channel, with deep water for large ships. The Bocca Tigris, or Hoo-tow-moon, forms the approach to Canton River. Near the middle of this is the island Wang-tong, between which and Anung-hoy Point is the principal entrance: about twenty miles above is the second bar, where large ships used to receive part of their cargoes; and about half-way between this and Wampoa anchorage, is the first bar, formed by a sand-bank and reef, stretching eastward. This anchorage is safe, but confined; covered on the south by two low islands, and on the north by the island of the same name; these divide the main stream from Junk River, the channels of which separate a little below Canton. This river, called by the Chinese Choo-keang, is easy and safe of access to large vessels, as far as Wampoa; but from thence to Canton the water is only deep enough for vessels of moderate size.

Of the islands about the entrance to Canton River, the Grand Ladrone, already referred to, is the most remarkable, as directly fronting the entrance; it is steep and bold, culminating in a bold dome to the north-west. There are several channels and anchorages among these islands; of the latter Urms-ton's Bay or Toonko Harbour may be mentioned, as well as Tonghow Cove; this, situated on the north-west of the island of the same name, is a small but very secure harbour, capable of receiving large ships. Another cove is found on the north-east of Lamma Island.

Hong Kong Island, distant from the north-east of Lamma Island two miles, is about ten miles long by five wide, of irregular shape to the south and east, forming safe bays for small vessels. Tylam, or Hong Kong Harbour, formed by the south-east point of the island, is one mile wide, with six fathoms water. This island is mountainous.

To the west of Canton River are the St. John's Islands, extending about thirty miles from north-east to south-west, forming a deep bay in the centre, where they are united by an isthmus of sand; to the south is the Island of Hawcheun, or False St. John's, which, with the Island of Namoa, forms the harbour indifferently known by both names. These islands are lofty, as are the others to the west, as the name Hai-lui-shan indicates; here is also a safe harbour, but the most important harbour on this coast is that of Tie-pak, or Tie-pie-hien; this is shallow, and unsuited to large vessels, terminating in extensive mud flats; yet the country rises boldly round it.

A peninsula, eighty miles long by fifty broad, separates the Gulf of Tonkin from the China Sea, off which, to the south, lies the Island of Hainan, of an oval figure, 150 miles long by eighty broad; the channel, separating it from the main, is thirty miles long and ten broad, with a cluster of shoals at the east entrance, and the small group of Tyshan Islands on the west. The twentieth parallel of north latitude intersects the western extremity of this channel, and the centre of the Gulf of Tonkin, marked by Nightingale Island, which is of triangular shape, and ten miles long by three broad. The east coast of Hainan does not present any good harbours; it is marked by the lofty peak of Tongou near the centre, off which is the island Tinhora. Galong Bay and Yuliu-kan Bay, near the south extremity, afford

anchorage for small vessels. The coast is said to be covered with rocks and shoals : the interior is high and irregular in outline ; the mountains are covered with forests, but extensive plains afford space for the cultivation of rice, sugar, tobacco, &c. The east coast is steep, the west low, with shallow water. The entrance to the gulf is due north from Cape Hapbox to Hainan 160 miles, from Frakaki Island to Hainan east 145, and from the line thus formed to the head of the gulf, 200 miles. This gulf is little frequented. From Point Canis, in  $20^{\circ} 10' N.$  lat. and  $109^{\circ} 50' E.$  long., the coast trends north ninety miles. Off the centre of this coast lie the small islands Guie-chow and Chayung, distant about 30 miles. The north coast is irregular in outline—probably of alluvial formation—and covered by groups of islands ; of these Houang is the most important : it is ten miles long by five broad. The north-west coast is higher, and has numerous islands off it ; of these, Gowtou, or Pirate Island, to the north may be mentioned : it is about ten miles long. Here are two deep bays, one of which, Chokum, receives the Sang-koi River.

Hue River is the most important on the Gulf of Tonkin ; it is situated near the southern extremity of the entrance ; it has good anchorage, but a bar at the mouth, with only two fathoms water. The city of the same name is some four leagues higher up the river. To the south of Point Hapbox is Port Quieck, lying at the foot of high mountains ; it is six miles broad and four deep, and affords good anchorage. Hapbox River extends some distance inland. The Island of Pulo Canton, or Collaoray, lies off this coast, which is high and bold, rising in mountains inland. Qui-chow Harbour affords good anchorage to the west of Cape San-ho, and there are other small coves and harbours ; but Phuyen Harbour is esteemed one of the best in the world ; it forms two outer and one inner harbours ; the former known as Xuandai and Vung-lam afford good anchorage ; but the latter, Vung-chao, is entirely landlocked, encircled by mountains, and has good anchorage in five fathoms water. The country here is very beautiful and fertile. Phuyen Bay is bounded to the south by Cape Varela ; a steep cape, marked by a lofty mountain. To the south of this is Hone Cohe Bay, surrounded by mountains, and the entrance covered with islands. Farther south is Nhuiatrang Road, receiving the river of the same name ; and still farther, Camraigue Harbour, the southern limit of which is Cape Varela-false ; or Muidavlaich. This harbour is double ; the outer covered by Tagne Island, the inner an extensive lagoon, both safe for all vessels. Into the north extremity of the lagoon a river, having its rise near Nhuiatrang, flows through a sandy plain, having its course parallel for thirty miles to the coast, from which it is only separated by sand hills. Southward of Cape Varela-false is the deep basin Vung-gang, surrounded by lofty mountains. Phauran Bay extends to Cape Padaran, to which point the coast has a southerly trending, but beyond which it turns to the west and south. The land here is high, marked by Mounts Guio and Taicon ; off it there are reefs, and at about seventy miles distant Catwick, Pulo Sapata, Pulo Ceicer, and other islets and rocks form a dangerous group. They are, however, mostly lofty, and can be seen from some distance.

Cape St. James, in lat.  $10^{\circ} 16' N.$ , long.  $107^{\circ} 4' E.$ , forms the north point of the entrance of Saigon River, called also Gagneray Bay, and, indeed, of the estuary of the Ma-kiang also, which, across the deltaic islands at the mouth of the latter, is sixty-five miles. The mouth of the Saigon is twenty-five miles wide, and the river is navigable for the largest ships. Gagneray Bay receives also Cualop River, navigable for small vessels. The Ma-kiang or Cambodia River has three principal mouths, the westernmost being the ship channel ; its entrance is, however, impeded by sand banks and deltaic islands, which extend for 100 miles up the channels, and for fifty miles in breadth. From the entrance of this river to Pulo Oby, ninety miles, the coast is of alluvial formation, perfectly flat, and traversed by channels, connected probably with the Ma-kiang, some of which open into the Gulf of Siam. This extensive deltaic formation is covered with trees.

Pulo Condore, the principal island of a group of the same name, is about nine miles long and four broad; has on the south-east a considerable bay, covered by islands. The harbour here is well sheltered; the island is hilly, culminating 1800 feet above the sea, and covered with timber. This group lies fifty-five miles south of the entrance of the Ma-kiang.

Pulo Oby, the north-east point of the entrance of the Gulf of Siam, is formed of several hills, of which that in the centre is the highest, and is twenty miles long by eight broad; from hence to the coast inside the Great Redang, the entrance of the Gulf of Siam is 200 miles wide, and from thence to Bangkok, at the head of the gulf, exceeds 450 miles in length. At the head of the gulf Points Liant and Cin contract the width to sixty miles, forming an inner gulf or bay. The east coast of the Gulf of Siam is but little known. Pulo Oby-false Island lies off the coast thirty miles north-west of Pulo Oby, and the coast forms a deep bight of 130 miles, inclosing a considerable island, named Koh-tron, twenty-five miles long by ten broad. Beyond this is Kapousong River, and thirty-five miles farther, Cape Samit, 120 miles from Cape Liant; off this coast, are Chang-koh-koot and Koh-kong Islands; the latter about fifteen miles long. There are also islands off Cape Liant as well as within it, of which Bamphasoi, the largest, is fifteen miles long.

The delta of the river of Siam occupies sixty miles of coast, and extends inland thirty miles; the best navigable channel is that to the east, where the land rises; the entrance is about a mile wide, and large vessels can ascend to the island of Bangkok, about thirty miles from the sea. Twenty-six miles south of the entrance to this river a group of islands form Ko-se-chang Harbour; to the west the coast is nearly straight for ninety miles to Point Cin, trending southerly, beyond which a deep bay stretches for 175 miles to Point Carnam; here the coast is hilly. Within this bay are several islands, of which the principal are Bardia, Sancori, and Carnam, besides the numerous islets of the Larchin Archipelago. Sancori is ten miles in diameter, and Carnam is lofty. Numerous rivers break the coast line to the south, of which Carnam, Ligor, and Boudelon may be noted. Off the coast, between these latter, lies the island Tantatam, forty miles long by twenty broad; the channel between it and the main is ten miles wide, forming a deep bend to the south, called Sangosi Bay. To the south, again, the Gulf of Patani, opening to the north, extends for fifty miles. From Cape Patani the coast trends north-east for ninety miles, broken only by the mouths of Bigana, Calanam, Blanam, and Tringany Rivers, none of which are navigable for vessels. The Redang Islands lie from ten to twenty miles off this coast. North of this are the Printian, Latinga, and other groups, and off Cape Patani, Pulo Sonu, fifteen miles long. The Great Redang is high, of considerable extent, and has a harbour fit for small vessels. Below this the coast, although it is slightly indented, becomes hilly, and is broken only by Tingeram and Pahang rivers, distant sixty-five miles; the former is barred with rocks, and the latter with sand-banks. Of the coast from this river to Singapore Strait (140 miles) nothing need be said.

2 *The Islands*.—To the south and east are several groups of islands; of these Tambelan, situated just north of the Equator, and distant sixty miles from Borneo, and 120 from Bintang, extends for seventy-five by sixty miles in area; the easternmost is Great Tambelan, having a sheltered channel on its west side, and an extensive basin or harbour on the east. These islands are mostly elevated. The Anamba group cover about the same area, but the islands are larger, and form two groups, the north-east consisting of Mata, Miobour, Siantan, and others, of which Mata is ten miles long; and the south-west consisting of Djimaja, about the same size as Mata, and some smaller islands. This island is 120 miles from the Malay coast, seventy from the island of Tioman, and thirty from the north-west group. These islands are high and fertile, and the northern group affords convenient anchorage.

The Natuna group lies about 100 miles north and west of Mata; the largest



is called Pulo-Hong-soran by the Malays; it is about thirty-five miles long by twenty-five broad, high rocks and cliffs at the north, and its coasts covered with reefs. Sixty miles south-east of the Great Natuna lie the South Natunas, a group extending over an area of above forty miles square. The two principal islands are Souli and Sirbassen; these are surrounded by numerous islets and coral reefs, the most southerly of which is distant from Point Api, on the coast of Borneo, only fifteen miles. To the north and east these shoals extend off the west coast of the islands, bounding the China Sea for 700 miles in length by 300 in breadth. Of the other shoals, Macclesfield bank, extending 100 miles by seventy-five, and the Paracels sixty miles by thirty, both lying off the Gulf of Tonkin, should be mentioned, as also the Pratas shoal off the mouth of the Canton River.

The southern cincture of the China Sea is formed by the islands of Bintang, Lingen, Banca, and Billiton; the former is separated from the main by the Strait of Singapore, and from the second by Brio Strait; it has several others surrounding it, especially to the south and west; it is of irregular form, thirty miles long by twenty broad, and presenting two deep bays on the south; it is lofty, culminating 1300 feet above the sea, and watered by five small rivers; it is distant ten miles from Romania Point, the south extremity of the Malay Peninsula. Mallan and four smaller islands lie to the west, Pajang to the south and east, and some islets to the east; Linga or Lingen, the most lofty of this chain, culminating 3750 feet above the sea, is distant fifty miles; it is covered with primeval forest, and extends thirty-five miles in length by fifteen in breadth, presenting a deep bay at the eastern extremity; Lobau and some other islands lie to the north, and Sinkro to the south; it is distant from Banca eighty-five miles.

Banca is an island of irregular shape, but exceeding 100 miles in length and thirty in breadth, having a deep inlet at its northern, and a small island covering its southern extremity; its south-west point is opposite Palembang River, on the coast of Sumatra, and gives name to the principal strait by which the Strait of Malacca and the China Sea are entered from the south; the strait which separates it from Sumatra varies from three to eight miles. The Bay or gulf of Klabat, at the northern extremity, is more than twenty miles deep, and the chain of mountains which runs through the island culminates above it in the peak of Maras; Mount Monopin does not reach 1000 feet. Much of the surface of the island is marshy; it has no lakes, but numerous streams, and is covered for the most part with fine timber, yet is not considered fertile; it produces most minerals, and especially iron and tin. Banca is separated from Billiton by Gaspar Strait, which is about sixty miles wide, and marked by two small islands, lying off the two principal islands, and one with some rocks in the middle of the Strait. Billiton is a quadrangular island, about forty miles in diameter; it is lofty, and resembling Banca in its productions, and especially tin, which is not found eastward of this island. The coast of Billiton is indented by three bays—one at the north point, at the mouth of Tieroti River, Linga Bay to the south, and one at the south-east extremity, but on this side the water is shoal; it is separated from Borneo by the Carimata Channel, 130 miles in width, measured from the east point of Billiton to Sambas Point on the island of Borneo.

3 *Borneo*.—Borneo may be considered the largest island in the world, Australia alone excepted; it forms an irregular triangle, having its base to the south 480 miles, its western side 600 miles, and its eastern 650; its coast line is estimated at 2000 miles, its greatest breadth is under the first parallel of north latitude, where it extends 600 miles from east to west; its extreme length is 700 miles.

This island has four well-marked divisions: the north-west coast separated from the rest of the island by a mountain range, which extends from the north angle for two-thirds of its length; a south-west, south and east basin, separated from each other by two spurs from the chain already noticed, which stretch towards Capes Sambas and Salatan on the south-west and south-east.

Of the interior very little is known, but the exploration about to be commenced will, if successful, leave little to be desired.

Borneo is separated from Palawan, the south-westernmost of the Philippines, by the Strait of Balabac, so named from the small island of that name, which lies off the south point of Palawan, as that of Balambangan does off the north point of Borneo. The former is fifteen miles long and ten broad, and has a harbour on the east side called Dalawan; the latter, more correctly Blambangan, so named from its palm trees, is about fifteen miles long by three broad; it is hilly, and has two small harbours; on the east side it is sterile. The neighbouring island of Bunguy is more than double the size of Balambangan; it is mountainous, and culminates 5000 feet above the sea. The strait leading into the Sooloo Sea is twelve miles wide, and marked in the centre by Sandy Islet.

To the south of Balambangan the coast of Borneo forms a deep bay, extending southwards twenty-five miles, and fifteen in width, with an inner harbour at the south-west; from hence a broken, irregular coast stretches 150 miles to the south-east, in the centre of which is the deep bay of Lambook, thirty miles wide; to the south again is Sandakan Bay, about ten miles across, landlocked, and having some islands within it. The north-east extremity of Borneo is a peninsula projecting sixty miles, and twenty in width; it covers Darvel Bay, an extensive sheet of water thirty miles wide at the mouth, with numerous islands; a feature continuous along the east coast of the great island. In the centre of this coast a great bight or bay, nearly 100 miles wide, seems to extend to the south, and beyond the peninsula or island which forms its southern extremity, Cape Kumungun, the eastern extremity of the island, projects at ninety miles distance. Within the bay or gulf thus formed, two considerable rivers flow into the same estuary, as do several smaller streams, into the more northern bay. This coast is low.

To the south of Cape Kumungun or Kaneoungan, the coast trends to the west and south, encircling the island Pamarong, thirty-five long by twenty broad; to the south of which the River Goti or Coti enters the sea by several mouths. Southward still is the Gulf of Passir, seventy miles distant from the Goti River, receiving a smaller stream.

Off the south-east point of Borneo lies the island Laut or Laut Pulo, the west limit of the entrance to Macassar Strait; it is of oval form, fifty miles long by twenty broad, and forming a deep bay at the northern extremity. This island is mountainous and covered with forest; the strait which separates it from the larger island is ten miles wide. From thence to Cape Salatan, the southern point of Borneo, is eighty miles; here the principal spur from the main chain of mountains reaches the sea, and to the west of the cape is the River Banjar or Burito. The mouth of this river may be seven miles wide, and its estuary extends inland more than twenty miles, where it divides, receiving the waters of the small river of Martapura from the east; beyond are Little and Great Dyak Rivers, the former of which may have a course of 300 miles, and the latter of not so many, but its mouth is the more extensive. The rivers Mendawi and Pembuan also break this coast to the east of Flat Point, which is distant respectively from Cape Sakatan 170, and from Cape Sambas or Sambar 110 miles; between these latter, the river of Kotta Waringin falls into the sea; it rises in the Lake Muwara Kajung, about fifty miles inland, and probably twenty-five miles long.

The south-west coast of Borneo is more indented than the south; and to the north of Cape Sambas are Laag, Kimpal, and some other small islands, and to the north of Cape Brie, seventy-five miles from Cape Sambas, a considerable river enters the sea to the south of the Bay of Sitkadana; north of which, again, is the mouth of the Simpang River, from whence the coast trends west round the island Mayang, which is of triangular form, and about twenty miles long; from which, towards the south-west, distant about forty-five miles, is the small island Carimata, or Kerimata, about nine

miles long ; it is lofty, rising 300 feet above the sea ; and between these are several small islands and reefs. This island gives name to the passage to the west, between it and Billiton, from which it is distant seventy-five miles.

To the north, the river Pontianak disembogues by several mouths, which appear to cover about seventy miles of coast. The south-east mouth seems to be the Niejak River, and the northern, where another smaller river is confluent, the Pontianak. This river, under whatever name it should be mentioned, is the largest in Borneo, both as to length and drainage area ; it is also remarkable as having one of its sources in Lake Malayu, which is estimated at twenty-five miles long by twelve broad, but not exceeding twenty feet in depth ; it is distant from the west coast 135 miles. Beyond is the inlet of Kubu or Booboo, lying in the centre, to the south of Cape Sapu, and farther north are the Mampawa and Sambas Rivers, the latter, though small, having a considerable estuary. This coast is low, deltic, and has many reefs off it ; it terminates at Api Point, about 170 miles from Magany Island ; from this point the coast trends east twenty miles to Cape Datou, then south-east forty, to Capes Sipang and Sarawak River, and thirty more to the river Loeper or Lupar, at the extremity of the bay formed between Cape Datou and Cape Sirik, which are 100 miles distant. The river Sarawak is formed by two streams, which from their confluence flow for twenty miles to the coast, and enter the sea by two principal and several smaller mouths, forming a delta about fifteen miles in extent. The eastern channel, called Morotabas, is navigable for large vessels, and is about three quarters of a mile broad. The Lupar has an estuary extending thirty miles in direct distance into the land ; the river is small. Between Cape Sirik and Barrow Point, distant 200 miles, the coast is almost unbroken, as it is also from the latter to Bruni Bluff, distant seventy-five ; within this, however, is the most important bay, and, in a commercial sense, the most important river and island on the coast of Borneo. Bruni, or Brunai Bluff, is distant from Kalias Point, the opposite side of the entrance to the bay, twenty-five miles ; the bay is double with that at the entrance of Bruni River, lying to the south ; the point of divergence of the channels surrounding the island Muasi, by which the Bruni reaches the sea, is fourteen miles. Here rich seams of coal are found, as also in the island of Labuan, off Point Kalias, fourteen miles north-east of the mouth of the Bruni, forming a sheltered and safe harbour ; it is triangular and about twelve miles long by five wide ; the southern shore is about six miles long, and has a small harbour, covered by the island Daat, which, with nine more, lie off to the south ; part of the island is high and covered with timber ; much, however, is marsh land, producing only mangroves, rattans, and palms ; the coal, which is excellent and found in thick seams, is for the most part at the northern extremity. From hence to Sampanangi Point, 130 miles, Gaza Bay, behind Yangaut Point, and Amboug Bay, lying at the base of Mount Kini-bal, may be mentioned. This mountain, an isolated mass of sandstone, resting on syenite, rises more than 10,000 feet above the sea, and has, it is said, a considerable lake at its base. The western chain of mountains culminates to the south near Lake Malo, 6,000 feet above the sea ; a Mount Tebang, in the centre, is also considered lofty ; the other ranges vary from 2000 to 3000 feet in elevation. The vegetation of Borneo might be taken as a type of the whole archipelago ; it is covered with a rank dense forest ; benzoin, eagle-wood, and gutta percha abound ; gold is found on the west coast, and the mountains are said to be rich in minerals. Its widest part is under the Equator.

4 *The Volcanic Belt.*—Beyond the southern cincture of the China Sea the great volcanic belt of Sumatra, Java, and their accompanying islands, stretches with a gentle sweep to the south-east and east, between the 95th and 130th meridian of longitude, and uniting the great island of Australia to South-eastern India and the peninsula of Malaya.

The great island of Sumatra is separated from the Malay peninsula by the Strait of Malacca, which is 500 miles in length, while in breadth it varies

from 300 to fifty miles; at the south-east extremity the available passage is narrowed by the small islands lying to the south and west of Bintang, to about twenty miles; and several islands lying on the north coast of Sumatra also contract its channel. The strait proper is, however, the portion included between the south coast of the Malay Peninsula and Sumatra, which is about 160 miles long, fifty in extreme breadth, and thirty from the coast of the islands Roupat, &c., to the main; the passages between Lingen and Banca must be considered as separate straits, and may be named from these islands.

The island of Sumatra or Samatra lies nearly south-east and north-west, is about 1000 miles long, terminating in a peak to the north-west, and being 180 miles broad at the east; its most northerly point is in N. lat.  $5^{\circ} 45'$ , its most southerly in S. lat.  $5^{\circ} 55'$ , and it lies between the 95th and 106th meridians of East longitude; it is in size next to Borneo, which it much exceeds in length, and is nearly double the size of Great Britain.

A range of mountains stretches through the island near its western coast; its eastern is formed by vast alluvial deposits, and its principal rivers flow into the Straits of Malacca, Lingen, and Banca. The mountains, many of which exceed 10,000 feet in height, culminate in Lusé, near the northern extremity, 11,000 feet above the sea; in the centre are five active volcanoes; of these Talang rises 10,250 feet, Marapi 9500, and Barapi 6000 feet; 15,000 feet has, however, been given as the elevation of Singallang in the centre, and others in proportion. The mountain region affords plains and valleys of considerable extent, those of the volcanic district being fertile, but much of the other partially, if not wholly, sterile. This appears to be caused by a strong dry wind, which, for the most part, prevails over the whole; the plateaux are thus sterile; but the valleys are fertile and beautiful, the mountains well wooded, and the alluvial plain, which extends for 600 miles along the north-east coast, with an average breadth of nearly 100 miles, is entirely covered with forests of gigantic growth, in which open glades are only found on the banks of the rivers. The rivers of Sumatra are known only by name. Those of the north-east coast are the Assahan, Baruman, Kakan, Siak, Kampur, Indragiri, Jambi, and Palembang; of these the Siak and Palembang are the most important, inasmuch as the bars at the mouths and the bore of the tide prevent the others from being accessible to shipping: the mouth of the first is formed by four considerable islands, separated from Sumatra by Brewer Strait, which does not exceed five miles in width; the latter is formed by three streams, the Kamring, Lamtan, and Palembang; has several anastomosing branches in its lower course, and a considerable delta, extending twenty-five miles along the coast.

The Indragiri has its rise in Lake Sinkara, which is about twenty miles in length by fifteen in breadth, and twenty-four fathoms deep. There are several other mountain lakes in Sumatra, the most important of which is that of Sapulu Kota at the foot of Mount Marapi, and in one, the name of which is uncertain, the Kamring has its rise. The rivers of the east coast are the Masruji and Pagadungan; on the west coast there is only the Singkel.

The mineral products of this island are of considerable importance: fine seams of coal are reported at Retch and Palembang; the iron ore is of excellent quality; gold is also found, and the metals known in the neighbouring islands may reasonably be expected here.

The coast line is but little broken, and there are few extensive bays; the most important is that of Tapanuli, on the west coast, which contains several good harbours, and to the north the roads of Soosoo, Bacoogong, and Tourroomang may be mentioned, as also the port of Qualla-battoo: in Si-leagu Bay there is anchorage, protected by the island of the same name, as there is at Baroos, behind the island Pouchang-cacheel, and in a harbour formed by islands at the south-east end of Mensular Island. The next harbour of importance is Boongas Bay, and further east Pulo Saytan Harbour, between the islands Sabadda and Troosan, should be named. At Bencoolen there is

only an open roadstead, but at Rat Island there is a safe harbour formed by an encircling coral reef, as also at Paolo Bay; but the latter is unhealthy. Billimbing Bay, near the south extremity of the island, is also to be noted.

Several islands of considerable size front the west coast of Sumatra, at an average distance of fifty miles; of these, Hog Island, the most westerly, is about forty miles long by ten broad, hilly, and covered with trees; and about thirty miles to the east is the group of Pulo Baina, or many islands, formed of two principal and several smaller. The largest island off the coast is, however, Pulo Nyas, about sixty miles long by twenty broad. This island lies south from Pulo Baina, distant thirty miles; Nyas River is on the east side, and another further south, into both of which ships may enter. This island is also hilly and wooded. Sirambo Bay, on the south side, has also good anchorage, protected by a group of small islands, but the chain of islands which covers the west coast renders approach to it dangerous. A small island, named Clapps or Clappers, lies south of Pulo Nyas nearly under the Equator; and the northern point of Pulo Batou, or Mintar, is also without latitude. This island is like the others, and affords shelter within the numerous small islands which cover its shores; it is about forty miles long by fifteen broad, and distant from Pulo Nyas nearly fifty miles. See Becrou or Sibiru, is distant from Mintar twenty-five miles; it is also called North Poora; it is little known, but must be more than fifty miles long and fifteen broad, and similar in character to the others. South Poora is a smaller island to the south, in which must be noted Hurlock's Bay, a landlocked harbour near its northern extremity; it is separated from North Poora by Seaflowes Channel, twenty miles in width. North Pagai and South Pagai follow in close succession, and about half-way between them and the south-east extremity of Sumatra, Pulo Engam stands out by itself; it differs little from the others, is surrounded by a coral reef, and has an excellent harbour at the south-east side; it is of triangular form, and twenty miles long.

On the west coast of Sumatra the south-east, or dry monsoon, blows from May to September, the north-west beginning early in October and continuing till April, being most violent in January, with storms, thunder, and lightning.

The southern extremity of Sumatra is formed by two deep bays, extending fifty miles across the westernmost. Keyser Bay is about fifteen miles deep; it is marked by a high conical peak, named Samanco, from which the bay is sometimes named: between that and Lampong Bay is another, Calambyan Harbour, at the east side of Keyser Bay, which is small, but safe. Lampong Bay is very extensive; its western shore is covered by a chain of islands. Sunda Strait, sixty miles wide at its southern, but narrowing to twenty at its northern extremity, separates Sumatra from Java.

Pulo Rondo, a high rocky islet off Achecn Point, at the north-west of Sumatra, is distant eighty-four miles from Great Nicobar Island. This is the south-west limit of Malacca Strait, which at this entrance is 240 miles wide; it is marked on the south by Golden Mountain, a conical peak, nearly 7000 feet high. The alluvial character of the north-east coast of Sumatra prevents it from having many harbours. Toboo Samwoi, Lanksa Bay, Qualla Harbour, Delhi, Batubarra, and Rakan River, may be noted.

The Island of Java, with those of Bali, Lombok, and Sumbawa, form the southern cincture of the Java Sea, which is 840 miles long by 250 broad; of rectangular shape, and limited to the north by Borneo, to the east by Celebes, and to the west by Sumatra; the western half is almost entirely clear of islands; the eastern has several small islands and groups on its surface. Detached off the coast of Borneo is the Laurot group, under the fifth parallel of south latitude, and near the centre of the sea the Solombo Islands; of these, the southern is high and the northern low and well wooded. Arentes Island lies eighteen miles to the north-east. About one hundred miles from the coast of Celebes is a range of five islands, Edam, Bankodang,

Amsterdam, and Rotterdam, and the Hen and Chickens. The reefs stretch fifty miles to the west, and occupy much of the area between the islands and Celebes. But the most important islands of this sea are those which stretch from the north-east point of Java into the Flores Sea, ranging parallel to Lombok, Sumbawa, and Flores.

Madura, the most important of these, is separated from Java by a strait from one to two miles broad, forming a deep but narrow channel, opening into an extensive bay to the south, about sixty miles in width, and more than 100 in length, but here the depth is not so great. The extreme length of this island is ninety miles, and its breadth about thirty. A low chain of mountains runs through the island, but it has no elevated peaks; and though, like Java, of volcanic formation, the soil is of comparatively poor quality.

Gohur and Sapali, with other islets, lie between Madura and Kangelang, or Kangayang, remarkable for its excellent harbour on the south-west, and the extensive reefs which stretch fifty miles to the northward of it; it may be twenty-five miles in length. Hastings Island lies about half-way between Kangelang and the Paternosters, a group of wooded coral islands and reefs, extending east and west 100 miles. Similar in character, but covering a much less extensive area, are the Postilions; to the south of Celebes. Salayer, Tonin, and Schiedam Islands, bound Java Sea to the east; the former is a fertile island about thirty miles long; the Tonin Islands are small, but connected with extensive shoals; the latter are two in number, about ten miles each in extent, and about twenty distant from each other.

The Island of Java, or Jawa, is in many respects the most important in the Eastern Archipelago; it lies between  $105^{\circ} 12'$  and  $114^{\circ} 4'$  E. long., and  $5^{\circ} 52'$  and  $8^{\circ} 40'$  S. lat.; it is 575 miles in extreme length, and 120 in extreme breadth. It is remarkable as having its southern coast open to the entire ocean, nothing being present between it and the Antarctic Sea; it is bold and precipitous, but the northern coast low; the entire coast line is estimated at only 1200 miles, and is not, therefore, deeply indented. On the northern coast are several islands besides Madura, but they are mostly small; on the south only two, Baron and Kambangan, requiring mention, the others being scarcely more than islets.

The west end of Java forms the east side of Sunda Strait, of which Java Head is the south-east limit; four miles off this lies Prince's Island, which is high and well wooded. This coast of Java forms three deep bays, but they do not present any feature worthy of notice. The north-west extremity is marked by the rocky mountain Gurung Karang, which rises 6000 feet above the Bay of Bantam, which forms an extensive harbour, enclosing several islands, of which Pulo Panjary is the largest; they are low and well wooded. At Batavia there is only a road covered by some islands, Edom, Hoorn, and Onrust, the latter of which is the naval station; and eastward the coast presents no harbours, but at Cheribon and Samarang are roads, and between them the coast forms a deep bight 125 miles in length.

Japara Point, marked by the volcano of the same name, extends forty miles to the north, and beyond this to the east lie Rembang, Jassem, and other small ports, noted for ship-building, as is Samanap in Madura; but Sourabaya, in the strait between Madura and Java, is the most important of any in the island.

The east end of Java forms Bally, or Bali Strait, which is only one mile and a-half wide. The south coast presents but few harbours; Pachitan is small, and but little sheltered; Segara Anakam, behind the west side of Kambangan Island, is preferable. The extensive bay, Wynkoofs, at the south-west end of this island, is of no importance.

The west end of Java is more mountainous than other parts of the island, though the general elevation is not so great, consisting almost entirely of mountains separating small valleys. The middle portion of the island, corresponding to the height between Cheribon and Japara, is the narrowest, and here the mountains are higher and the plains more extensive, and both here and to the east a

low alluvial plain stretches along the northern coast. The eastern extremity is again more mountainous. Java is one of the most remarkable among the volcanic islands of the world, traversed throughout its entire length by a range of mountains, in which there are forty-six volcanic cones, of which twenty are in active operation. They vary from 4000 to 12,000 feet in height, those of the south and east being the most lofty; the extinct cone of Semero has been estimated at 13,000 feet; Sumbang, another crater, at 11,000; Slamet, in the centre, at 11,300, and Gedee, to the west, at 9850; some of the craters are of great size; the most remarkable is that of the Tenger mountain at the east end of the island, having a diameter of three miles, a level bottom, and a conical peak rising from the centre 600 feet. To the south of this central range is another of remarkable basaltic formation and not exceeding 3000 feet in elevation, and the south shore often presents precipitous cliffs of eruptive rocks. Hot springs are frequent, and mud volcanoes are found in the low lands yielding salt for common use. Java has no considerable lakes, but several small mountain lakes of great beauty; there are some extensive marshes; the rivers are numerous, but small, and not navigable. The mountain valleys of Java are extensive, and in the centre extend into plains. The vegetable and animal life of Java is probably more varied and vigorous than in any island of the Archipelago, differing remarkably in many respects from that of Sumatra; the teak, so abundant in the former, does not grow in the latter, and the difference of their zoology is much more remarkable, Sumatra having the elephant, tapir, and orang-otang, and the Argus pheasant; Java the Sunda ox and the pea-fowl.

The island of Bali, or Bally, is about seventy-five miles long by fifty broad, and of triangular form; it is of volcanic formation, culminating in the well-known peak of the same name, more than 12,000 feet above the sea. Of the chain which runs through the island, many peaks are volcanoes in present or recent action; of the former, Batem, 6000 feet in elevation, may be mentioned. On either side of this chain, to the north and south, fertile plains are found, and one group of calcareous hills. The island is remarkable for its natural fertility, increased as it is by irrigation from its numerous mountain lakes, situated at considerable elevations. The flora of Bali is similar to that of Java, but the fauna is deficient in the elephant, rhinoceros, and tapir. The rivers of Bali are numerous but small. Balabonang Bay, five miles deep on the Java side of the island, affords anchorage.

Bali is separated from Lombok to the east by a strait from four to five miles in width, at the entrance of which is the small island Nousabali. Like the other islands, Lombok is of volcanic formation; a chain of mountains, evincing recent action, running through the island on the north side, and a lower chain of calcareous formation parallel to it on the south; between the two is a plain studded with small volcanic cones. Gunung Rinjani, known commonly as the Peak of Lombok, on the east side of the island, rises more than 12,000 feet above the sea. Like Bali, this island has many mountain lakes, some probably occupying extinct craters, and one of these more than 8000 feet above the sea. The rivers are small, and useful for little but irrigation. The flora of the island is not so rich as that of those to the west, the teak tree is wanting, and the timber generally inferior. Lombok is about sixty miles in extreme diameter. Ampanan is a large open bay, on the west side of the island, and Laboan Treeang, or Labuhan-pring, a small harbour within it; Sumbawa is separated from Lombok by the Strait of Allas from six to nine miles in breadth. Though much larger than Bali or Lombok, it is of less importance, but not dissimilar in character: it is, like them, of volcanic formation, culminating in Tomboro more than 9000 feet above the sea, an eruption of which, in 1815, caused great devastation. The surface is much broken by ridges of eruptive rocks, and the quantity of water is less than in the other islands, lakes not being found there. The flora is, however, improved by the presence of teak, and its fauna by the horse, and there are many small but fertile valleys.

The island is 140 miles long by fifty broad; the southern coast is continuous, but the northern broken and indented, one deep bay, named Bima, stretching forty miles into the land, and giving the eastern portion a peninsular character; it is on the irregular extension which forms the northern side of this bay that the Tomboro volcano is situated; and off this is the small island of Mayo. Here is the strait of Salee, and to the west lies the bay of Sumbawa, affording good anchorage.

Sapy Strait separates Sumbawa from Flores; it is divided into two channels by Commodo Island, which rises high and steep, about thirty miles long from north to south, and ten broad, of volcanic formation, and separated from Flores by Mangderai or Mangarai Strait, about twelve miles broad; Sapy Strait is about eighteen miles broad, and divided to the north by Galibanta Island. Gounong Api, another small island, lies off the north-east point of Sumbawa.

Flores, Mangarai, or Eude, continues the volcanic band to the east; it is 200 miles long, fifty broad. The mountains are covered with forests, and rich, it is said, in mineral wealth; near the south-west point is Alligator Bay, forming a good harbour. Towards the centre of the south coast, which forms a wide bay, are two volcanoes 7000 feet in elevation; there is another marked on the charts near the west end.

To the south of Flores, distant thirty-five miles, is Sumba, Chandana, or Sandalwood Island, near the centre of which the meridian  $120^{\circ}$  East, intersects the parallel  $10^{\circ}$  North; it may be sixty miles long by thirty broad, is mountainous but fertile, abounding in buffaloes and horses. Padewahy Bay, to the north-east of the island, at the mouth of the river of the same name, affords good anchorage; to the south is a group of rocky islands.

Five small islands separate Flores from Timor; these are Admora, Solor, Lombok, Pantar or Putar, and Ombai; they are all bold and high, of volcanic formation, and comparatively barren. The last is forty-five miles long by ten broad, the others rather smaller; the passages between them are all navigable, and the Strait of Flores, to the west, and the Ombai passage, or Timor Strait, to the east, are well known; the latter separates Ombai or Ombay from Timor. This island lies north-east and south-west, and as the direction so the character of this island differs from those already noticed; it is not volcanic, and approaches more nearly in character and productions to Australia than to the other islands of the Eastern Archipelago. The surface is hilly, the valleys small and narrow, but the elevation not exceeding 5000 feet; the rivers are very small; there are no lakes, and, like the flora, the fauna of the island is comparatively thin and poor; it may be 370 miles long by fifty broad. Copang Bay forms a good and extensive harbour at the north-west angle, off which are the islands Semas and Rottee; the former, similar in character to Timor, separated from it by a narrow but navigable strait, and about eighteen miles long, the latter about sixty miles long and thirty-five broad; it is very rugged and rocky, yet produces excellent horses and buffaloes, and the usual tropical vegetables.

The insular encircled sea, which stretches its long narrow waters for 2000 miles east from Sumatra to New Guinea, has its south-eastern cincture in the double chain of islands which trend north-east and north from Timor and Wetter to New Guinea and Banda. Its eastern extremity, called the Banda Sea, is about 200 miles in width, and is marked by the singular volcanic island Gounong Api, about sixty miles north of Wetter Island, which rises 2500 feet above the sea, and is one of the most active volcanoes in these seas. The inner chain consists of five principal and some smaller islands; they are high, and well wooded. The outer are more important. The Serwati group is small but fertile, and extends for 150 miles from the north point of Timor to within fifty miles of Timor Laut, which is the most southern and largest of the group called Tenimber; it is about ninety miles long and thirty broad, low and of coral formation, surrounded by reefs, and without shelter for shipping. The rest of the group are of similar character, but much smaller. Loral is the next in size. To the north of these are the Kei Islands,



which are high, rocky, and well wooded. Of these the largest may be forty miles long, and two others are of considerable size. Boen and other rocky islets connect them with the island of Ceram by the little islands of Goram and Kessing to the south-east.

The Banda or Nutmeg Islands are ten in number, forming, as their name implies, a compact group. The largest, Loutar, or Great Banda, is only seven miles long and two wide; they are of volcanic formation, fertile, and well wooded.

## CHAPTER XLIII.

§ 1. The Philippines.—2. The Moluccas.—3. New Guinea.—4. Australia.

**THE Philippines.**—The northern point of the great eastern Archipelago is distant more than 1500 miles from its southern limit, the volcanic band. Over the northern half of this, the Philippine Islands extend, between the 5th and 20th parallels of north latitude, covering a triangular area having its sides 750 and 900 miles, and its base about 550. Their western coasts, as already noticed, form the eastern limit of the China Sea. This group consists of three large and several smaller islands; the largest, Luzon, being to the north, and the next in size, Mindanao, to the south; Hummock Island, to the south of the latter, is in lat.  $5^{\circ} 24' N.$ , and the Isles Babuyanes, to the north of the former, in  $19^{\circ} 38'$ , thus extending over more than  $14^{\circ}$  of latitude.

Luzon, or Luconia, is of very irregular shape; the northern portion being of primitive formation, the southern wholly volcanic; its estimated area exceeds 50,000 square miles; its extreme length may exceed 400 miles, but the southern peninsular extremity is very narrow in more than one place: without this the island may be estimated as above 300 miles from north to south, and above 100 from east to west; the surface is mountainous, but well-wooded, and culminates in Banajao, 6200 feet above the sea; it has several active volcanoes; the coasts are for the most part rocky: the eastern, with the small island, Catanduanes, forms a bay 200 miles in extent, within which there are said to be numerous bays and harbours, one of which, S. Miguel di Naja, fifty miles west of Catanduanes, is covered by islands and reefs, and about half-way between them, Port Seceeran, also sheltered from the sea by a group of islands, the largest of which, Quinalazag, or Ticao, is a secure harbour. On the south coast of Luzon are Sorsogon Harbour and Batangas Bay; both are safe, and have good anchorage; so have Port San Jacinto, at the north-east end of Ticao, Tardugan, to the north, and San Miguel, to the north-west of the island. Manila Bay, being above thirty miles wide and as many deep, offers only an open roadstead, but the Port of Carite on the north side is well sheltered. This bay receives the navigable river Passig, which flows through a fertile plain. The north-west coast of Luzon is for the most part bold, though in some places level, and covered with trees. To the east of Cape Bolnios is the bay of Lingagen, about the same size as that of Manila; it also receives a river bearing the same name, as also two others called St. Fabian and St. Thomas; indeed this island is remarkable for the number of its rivers, the largest of which, however, the Tayo or Aparri, which flows through the plain of Cagazan, is only fifty-five miles long; it has also several lakes. Began Road, marked by a gap in the mountains, Solousolou Bay and Salomogne Bay, are also on this coast. Coal is found on the north of Luzon.

The island of Mindoro lies off the south-east point, and that of Samar off the south-west point of Luzon, the former at about twenty miles distant; its estimated area exceeds 4000 square miles, and its extreme length may approach 100 miles: it is also called Mindora; it is very mountainous, but not volcanic,

and is traversed throughout its entire length by three ranges; it is well watered and well wooded. The west coast is steep; there is good anchorage in Calapan Road, at the northern extremity, under shelter of the Baco Isles. The island of Samar is also distant twenty miles from Luzon; it is 150 miles long and eighty broad, remarkable for its fertility, and producing excellent timber. Cape Espiritu Santo, the north-east, in latitude  $12^{\circ} 40'$ , is high and bold; and to the east is the port of Palapa, covered by the island Batag. The channel between this island and Luzon is known as the Embocadero, and is much frequented, though narrowed by islets and reefs. To the west of Samar are Burias and Masbate; the latter is seventy miles long by twenty broad, and has two ports, Barreras and Catayugan. Port Magna is in the middle of the north-west side, and between this and Mindora, Marieduque and Bemtou, the former forty miles long by ten broad. The harbour of St. André is near the north-west point. Panay, or Pany, to the south of Masbate, is about 100 miles long, of irregular triangular shape, with the apex to the south. The south point, Naso or Nasog, is high and bold; near it there is a safe harbour at Yloylo, and another to the north called Antique Bay. The coasts of this island are for the most part low, but a chain of mountains runs through its whole length. To the south of this is Buglas or Negroes' Island; this is about 150 miles long, but very narrow, high, and bold; on the west side, near the south point, Siatou, there is good anchorage in an extensive bay.

To the east of Panay is the group of rocky islets known as the Cuyo Islands. Of these only one, the Grand Cuyo, need be noted; but this is of some size, and fertile. To the east of Panay is likewise the island Guimaras. There are also one large and several small islands between Negroes' Island and Leyte, which lies to the south of Samor; this is 130 miles long by thirty broad, is high, and very fertile. To the south-west lies Bohol, which is about forty miles in diameter; and to the east, between Leyte and Mindanao, a chain of islands, among which may be named Camiquimo, Aliguay, and Silmo; Omokou, and Soloan, and Panoan, and Surigao, near the coast of Mindanao, between which is the passage to the Pacific.

Mindanao, or Magindanao, is of irregular shape, the principal portion being of an oval form, 250 miles long from north to south, and above 100 broad; and to the west of this a peninsula extends 180 miles, having a breadth of about seventy-five, making the island in this direction about 300 miles in length; its area is estimated as exceeding 35,000 square miles. This island is mountainous, but wooded and fertile; much of it is volcanic, and there are extensive plains in the interior; the northern coast is steep and bold, and very deeply indented: here is Vligan Bay, and beyond, to the east of the north point, Surigao Road, covered by a chain of islands. The east coast of this island is but little known, though there are several good harbours there. Near the south point is the large bay of Tayloc, within which lies Illana, or Bongo Bay, which receives the river Mindanao or Pelangy, which is navigable, but has a bar with only twelve feet water. Pollock Cove is also a good harbour, and to the west of Illana many rivers fall into the sea; here is also Kamaladan Bay, within the island Pulo Lutangan, and Sugud Boyan Bay, to the north-west of the Serangain Islands: here are wide and fertile plains, abounding with deer, and marked by a high conical mountain, rising to the east; on the north-west is Butuan Bay, into which the surplus waters of the great Lake Mindano are carried by a considerable river; there are also several other lakes and rivers, known only by name.

The Philippines are connected with Borneo by Palawan on the west, and the Sulu or Suluk Islands on the east, enclosing a quadrangular area 400 miles long by 200 broad, known as the Mindoro or Sooloo Sea. Like the rest, Palawan is lofty in the interior, but flat on the coast; its length may be taken at 250 miles, and its average breadth at thirty; it is of long, irregular form, and little known. Cape Booleyloogan, its south-western extremity, is in lat.  $8^{\circ} 25' N.$ , long.  $117^{\circ} 14' E.$ ; the east and west coasts are covered by small islands, and a chain of low wooded islands connects it with the

island Balabac to the south; this is about fifteen miles in length, and marked near the middle by a short peaked hill: Delaware Bay, to the south, affords good harbourage. To the south of Balabac are the islands Balamangan or Berobangan, and Banguay, near the coast of Borneo: the former is about the same size as Balabac, high to the south, and has two good harbours to the east; it is three miles distant from Banguay, which is rather larger; it has a conical peak on the north-west side, and there are many islets off the west, east, and south sides. The passage between Balabac and Balamangan is the best entrance into the Mindoro Sea.

The Sooloo or Suluk chain consists of above sixty islands, the largest of which, Sooloo or Jolo, is near the centre; it is thirty-six miles long by twelve broad. Sooloo Road offers but insecure anchorage, but Toolyan Bay, near the south-east, is large and well sheltered; there are many islets on its coasts. The island Cagayan Sooloo, with its surrounding reefs and inlets, lies about fifty miles to the north of Borneo; it is only ten miles long, and seven broad. Mambahenawoer is situated thirty miles to the south of Cagayan Sooloo, and is connected with the reefs and islets which cover the north-east coast of Borneo. The Tawee Tawee Islands are very numerous, as are the Leegetan Islands, which lie beyond them. Setceoge and Tamlagan lie to the east, and have a passage one mile and a half broad, with deep water between them. The rock here is coral. Pungastaren, in latitude  $6^{\circ}15' N.$ , the most northerly island of the chain, is low, covered with trees, but has deep water to the south.

Off the south of Mindanao are the Sangir, Meangis, and Tulour Islands, the former connected with Mindanao by a chain of small islands, which yet have passages between them for ships. The Tulour or Salibabo Islands are of considerable size, three in number, and moderately high, with some contiguous islets; they are eighty-five miles distant from Sangir: Tulour, or Karkalang, the largest and most northern island, is about thirty miles long; Kabruary is the most southern, and Salibabo or Lirog, situated to the north-west of Kabruary and marked by a table hill, has the best known anchorage in the group in the road of the same name. The Meangis Islands are also three in number, with many rocks, reefs, and islets off them. The Serangani Islands, two in number, and one already noticed as Hummock Island, and named from a remarkable hill on it, are distant fifteen miles from the south point of Mindanao, which is sometimes called from them, Serangani Point.

Sanguir, or Sanguay, is a mountainous island, above twenty miles in extent, lying about half-way between Salibabo and the north point of Celebes. There is a good harbour on the east, and the west is deeply indented. To the south of this, again, are the small islands Salo or Siao, and Tagalonda; of these the former is the largest, and is marked by a high conical volcanic peak; it is distant from Tagalonda ten miles, and the same distance from Bejaren, which is fifteen miles from Banca, separated from Celebes by the strait of the same name; there are many islands to the west known under the same name. The area contained between Mindanao, Borneo, and Celebes approaches in form to a right-angled triangle, having its base and perpendicular about 400 miles long; it is sometimes called the Sea of Celebes.

The very singularly-shaped island of Celebes, and its miniature counterpart, Gilolo, separate the large eastern from the western group of the Eastern Archipelago. Of these two islands very little is known; the former is, however, frequently passed by the Molucca, Salagir, and Macassar passages. The four great peninsulas which form this island, of which three are about 250 miles long, and the fourth, the northern, more than 350, render its shape familiar to all. The north point is Cape Coffin, and to the west is Manado Bay; this coast is high and bold; to the east is the anchorage of Kema, marked by Mount Clobat, to the south of which is the Strait of Limbe, between the island of the same name and Celebes; this, though dangerous as a passage, affords anchorage as a roadstead; the mountains here are very conspicuous. The northern peninsula forms Goomengtela, or Goomeng Bay, into which, from the north, a river of the same name flows; here are two coves, and anchorage within the

mouth of the river. This bay, or gulf, is 250 miles deep, and above 100 broad, and is also known as Tomi or Tominie Bay. To the south is a triangular area formed by the two eastern peninsulas, which are distant from each other more than 200 miles; within it are several islands, and in the angle is Tolo Bay. The southern peninsulas form Boni, Bonny, or Bugges Bay or Gulf, above 200 miles deep and fifty broad, very irregular, and full of rocks and shoals; the river Boni falls into the bottom of the gulf, which also receives the river Chinrana, navigable for small vessels to Lake Labaya. The area of Celebes is estimated at 73,000 square miles, and it is said that no point on its surface is distant fifty miles from the sea; it is not so much wooded as many of the other islands, but has a large teak forest; the northern peninsula is volcanic. The principal ports are Mangkassar, or Macassar, on the south-west, Menado on the north, and Kema on the east. The harbour of Macassar has a very difficult entrance among the shoals which cover it. The south-west point of Celebes is called Layk, or Layken Point; here is Bontheai Bay, marked by Lompobatang, a peak rising 8000 feet above the sea; and Boele Comba Bay, receiving Dennelong River, which is partially navigable; this coast is dangerous from coral reefs.

Salagir, or Zalagir, and Boeton, or Bouton Islands, lie off the southern extremities of Celebes; the former, called Boegeroens by the Dutch, is about thirty miles long, hilly, and very fertile. From it the Tonin or Baglawang Islands stretch to the south. Bouton Island is of middling height, more hilly to the south; it is of crescent form, and about fifty miles long; the west side forms a strait with the island Pangasum, formerly much frequented, though only one mile wide. The east side forms a deep bay, called Dwaal, or Deval, in the north part of which is Calansacsœ Harbour; to the north is Waganwang or Weywongy Island, the first of the chain which covers the east coast of Celebes. Tocambaso, called by sailors Token Bessy's Island, with many others, lies outside of Bouton. They are for the most part high, rocky, and abound in cocoa-nut trees. St. Matthew's, Vilthocus, and the Xullas Islands lie between Bouton and the Moluccas; the latter form a group of four, of which the largest is above twenty miles long; they are high and fertile.

2 *The Moluccas*.—The Moluccas, or, as they were formerly called, the Spice Islands, lie between Celebes and Papua, or New Guinea. This name is extended by some to the islands of Gilolo, Ceram, Waygeo, Booro, besides Amboyna, Oby, and the Banda Isles, but is properly confined to the five islets lying in a chain north and south on the west coast of Gilolo, viz., Ternate, Tidore, Mortir, Makian, and Bachian; they are volcanic cones, Ternate, to the north, being still active; Bachian, the southern, is the largest. These islands are the native country of the clove, where only it can be brought to perfection; the others, although not suited to the growth of this spice, are of the greatest fertility, especially in nuts, fruits, and roots; the sago palm abounds, as do many valuable woods; and the pearl fisheries round them are very productive.

Booro, the most westerly, is high, and marked by a semicircular, dome-like mountain on the north-west; it is about forty miles south of Xulla Basi; its area is estimated at about 2000 square miles, and it may be about thirty miles in diameter. Cajeli Bay, on the north side, affords good anchorage, and is marked by the small high island Manipa, which lies to the east, about half-way between Booro and Ceram; as also by two rugged peaks on the south side. Wood of excellent quality is found at Booro, and Caipooty or Cajepoot oil is obtainable in large quantities. The small island of Amblau lies five miles from the south-east point of Booro. The passage to the north-west is called Pitt's Passage, and is much frequented. Ceram, the largest of these islands, is 160 miles long by forty broad, and consists of one lofty mountain range of about 7000 feet general elevation, but culminating about 9000; it is covered with continuous forests, and its coasts are deeply indented. Lahoo Deep Bay is formed by the peninsula of Hoewama at the

western extremity; Sawa Bay, on the north, is covered by several islets; and Waroo Bay, on the north-east, affords good anchorage. Ceram is mountainous, culminating in Nusa Keli, nearly 10,000 feet above the sea, and is covered with dense forests. The island of Amboyna lies in the mouth of Lahoo Bay, and is the largest of a group of five, situated off the west point of Ceram. It has been described as consisting of "a main body and a narrow peninsula parallel to it, the isthmus which joins them not being more than a mile and a half in breadth," forming a bay fourteen miles deep, forming two harbours, the outer remarkable for the great depth of water, the inner for the malaria arising from the marshes which surround it. This island is hilly, formed of granite and plutonic rocks, fertile, and for the most part covered with wood.

The island of Oby, called Major, to distinguish it from another in the China Sea, is situated about 100 miles to the north of Booro, and lies at the entrance of Dampier's Strait on the east, and the Giloli Passage on the west; it is, like Xulla Basi, of moderate size, and high; several other islands lie between it and Gilolo: of these the Dammer Islands and Ordel are close to the south, or Cocoa-nut Point, which is in lat.  $0^{\circ} 48'$  S. To the west of Gilolo are the small islands Tawally and Maregolang; between which and Batchian, or Battyang, is the strait of the latter name; as between Batchian and Gilolo is that of Patientia, in which are several safe anchorages: these islands are high, and Batchian may be nearly fifty miles long. Xulla or Chulka Mangola extends for above 100 miles between Pulo Oby and Celebes, limiting the Molucca passage to the south; it is very narrow, and with Talyabo and Basi form the group known as the Xulla or Horn Islands; they are high, fertile, and have bold rocky shores. Another group, consisting of three smaller islands, lies between the Xulla Islands and Celebes.

Gilolo, or Halmahera, like Celebes, presents three peninsular extensions to the east; the west coast is nearly linear, and from north to south may be nearly 200 miles in length, while from east to west the greatest extension is about 100; its estimated area is only 6500 square miles: it is mountainous, well wooded, and fertile, rising to the north in three remarkable volcanic peaks, of which Kanore exceeds 6000 feet in height. The Talendiny Isles, which are numerous and only of moderate height, face the western coast. Off the north point is the island Mosty, or Mostay; this is about forty miles long; and the little island of Riow lies to the west. Mosty is high and fertile, and abounds in wild animals. The south-east extremity of Gilolo is Point Taho, which slopes gradually towards the sea, terminating in a bluff; the land about is hilly. Off this point is the islet Moar; and, about twenty miles to the south-east, the island Geby, about twenty miles in length, lies under the Equator, in the centre of Gilolo Passage; and between this point, also known as Jabo or Patany, and the north-east extremity of the island, is the great Bay of Ossa; in it are numerous islands offering shelter and anchorage; the shores also offer shelter. Ayer Watchy River is partially navigable, and the waters brackish for a mile from the sea. Maha River is at the bottom of the bay.

Close to the west shore of Geby, and forming two good harbours, is Fow or Faux Island: here nutmegs are abundant; and other small islands lie to the south; of which Eye Island bounds the east side of the north entrance of the Gilolo Passage. A range of islands also stretches towards Waygiou, of which the southernmost, Rouib, is the largest and highest; Eeu the most easterly, and Wyang the most northerly: they are mostly high.

Waygiou or Waygeou, called Quarido by the natives, is high and rugged, about eighty miles long by thirty broad, very fertile, and presenting to the north several excellent harbours; of which Piapis is distant two miles from the west point of the island, which is called Cape Forrest. Ports Duperrey and D'Urville are separated by a peninsula terminating in Point Coquille. Offak Harbour, marked by two remarkable peaks, is about thirty miles distant from Piapis, and between them is Arago Bay; and Ranak Bay is

twelve miles to the east; this is covered by the island Ranak; and to the north-west, distant four miles, is Manoaran. Boni Harbour, near the north-east point of the island, is also formed by an island of the same name. More than twenty miles to the east is Ceram Laut, a group of small low islands, about twenty in number, surrounded by a reef distant from two to three miles from them; these form three groups, of which the south is the larger, and consists of five, extending east and west fifteen miles: they are all low, and the outside of the reef so steep, that at thirty yards from the breakers no bottom was felt with sixty fathoms of line.

Gamen or Gemi Island covers the Great Bay of Chabral, on the south-east coast of Waygiou, and sometimes gives name to the strait better known as Dampier's; it is the largest of several islands on the north side of the strait. Chabrol Bay extends far into Waygiou, approaching within about two miles of both Offak Harbour and ports Duperrey and D'Urville; the shores of the bay are deeply indented on the north. Port Blossenville forms a good harbour. Popa and Mysole Islands are also to be noted, the former fifteen miles long, with reefs attached, the latter about forty miles long and twenty broad; it is forty miles distant from New Guinea, and about it are many small islands: of these, the most important are the Kanary Islands, to the north; they are low and wooded. Buttanta Island, thirty miles distant from Waygiou, forms, with Salwally Island, Pitt's Channel, about ten miles wide. This island is about twenty-five miles in length and breadth, and separated from New Guinea by the narrow passage called Galowa Strait; it lies in a deep bay formed by points Salce and Spencer, the foremost being the south-west point of the great island.

3 *New Guinea*.—New Guinea, also called Papua (a corruption of Puat-puat, referring to the woolly heads of some of its inhabitants), is about 1400 miles long, and of very irregular breadth; its greatest diameter may be 350 miles, but it extends from twenty miles north of the Equator 500 miles to the south, and is separated from Australia by Torres Strait, which does not exceed eighty miles in breadth. This island is formed; its greatest mass lies to the east, and is nearly 1000 miles long. To the east of this is the great bay of Geelvink, more than 200 miles wide at the mouth, and about the same depth; beyond which are two peninsulas, separated by a deep gulf, called M'Clure's Inlet, which approaches within forty miles of Geelvink Bay, as that does within twenty of the Arafoura Sea. Of this great island we know but little; to the west the mountains do not attain a great elevation, but through the centre a snowy range is reported, which must approach 20,000 feet in altitude; and as the entire island is covered with forests of gigantic growth, the peaks of the mountains alone excepted, the interior cannot be known until fully explored. No rivers of any size have as yet been discovered, no lakes are known or reported; yet, with so much wood, the interior cannot be destitute of water.

The north-eastern coast of New Guinea is remarkable for the lofty conical islands which lie off it, probably the craters of extinct volcanoes, the sides of which are now covered with wood; of these, Rocky or Lottin Island is about 4000 feet in elevation, Crown Island and Sir R. Rich's Island about 2000; but Dampier's Island not less than 5000 feet in elevation, and having a circumference at the base of 40 miles; and beyond this are many others, one group forming the Schouten Islands: they are all of the same character, and contrast remarkably with the coast of New Guinea, which is here low, and in many parts presents open savannahs and glades in the forest. Towards the north-east the Finisterre mountains approach the coast, and are estimated at 13,000 feet in elevation. The coast is in many parts deeply indented. Humboldt Bay, four miles wide, penetrates deeply into the land, marked by lofty mountains on either side. Matterer Bay, fourteen miles westward, is larger and deeper.

In the mouth of Geelvink Bay are several large islands. Jobei is of very regular outline, 90 miles long, high, but decreasing in elevation to the west,

and well wooded, separated from Bultig or Hump Island by a strait six miles wide; this and Quoy Island are of the same character, but smaller, the latter separated from point Geelvink by a strait only three miles wide. The harbour of Dorei, the best known portion of New Guinea, is situated within the westernmost point of Geelvink Bay, and formed by the peninsula of Mamosi and the islands of Mauasonari and Masmapi; it is only about half a mile deep and 200 yards in width, but capable of receiving the largest vessels; the surrounding lands are low, and covered with luxuriant vegetation. There is no appearance in New Guinea either of extinct or recent volcanic action; slate and limestone are the principal known rocks, and from the appearance of the country, as well as the animals found on the coasts, the island may be considered as the connecting link physically, as it is apparently, between the Eastern Archipelago and the semi-continent of Australia. The zoology is remarkable: no bovine animal, deer, monkey, or carnivora have been found. The hog and kangaroo are the chief mammals; birds and reptiles are abundant.

As New Guinea is the connecting link with Australia, so the Solomon range connects that island with the groups of the Central Pacific.

New Britain and New Ireland, separated from New Guinea by Dampier's Strait, about fifty miles wide, may be considered as the extension of the volcanic range of the north-east coast of that island already noted; they form a deep bay, 250 miles broad and 100 deep, opening to the north-west, the former having a curved outline from east to north-east, and the latter from north to north-west. New Britain may be nearly 300 miles long, but very narrow; New Ireland, 180 from north-west to south-east, and 75 from north to south. The north-east point of New Britain is evidently of volcanic formation, and the elevation considerable, the mountains being visible sixty miles to sea; it forms a peninsula, and the coasts are deeply indented; there is Port Montague, the country about which is well wooded and well watered. To the north the coast is rocky; to the south the ascent from the shore gentle, and the woods broken by savannahs, above which rise lofty detached mountains. New Ireland is of the same character as New Britain; it has an excellent harbour, named Carteret, at the south-eastern extremity.

Many smaller islands lie off their coasts; there are many within the great bay, and several of considerable size to the north; they are all mountainous and well wooded; the most northern are Squally and Mathias islands. New Hanover lies off the north-west extremity of New Ireland; it is about thirty-six miles long, and of great fertility and beauty. Admiralty Island, the largest of a group of the same name, is about fifty miles long; it is mountainous, and the coast covered with islets and rocks, and about 150 miles distant from the coast of New Guinea and from New Hanover.

The Salomon Islands form a long chain, commencing 100 miles to the east of New Ireland, and reaching to within about 200 of Santa Cruz, in all about 600 miles. This chain consists of ten principal and several smaller islands, which are formed by a range of mountains having its axis in the direction of the length of the islands, i.e., from north-west to south-east; they are covered with luxuriant vegetation, and considerable rivers are reported. Of these islands, Santa Anna is the most southern, and also the lowest, not exceeding 500 feet in elevation: Banka Island is the most northerly; it is also comparatively low, well wooded, and fertile: Bougainville Island is lofty and well wooded; to the north the mountains approach in elevation to the region of perpetual congelation; a long extent of low land borders it to the north-west, and Mount Cornwallis is reported to be a volcano; it may be 100 miles long by twenty-five broad, and is separated from Choiseul Island by the strait of the same name, in which lies the small island Shortland. Choiseul Island is on the north-east, very high, and its coast rugged and inaccessible; but about the north and east points there is low land: Choiseul Bay is on the north-west side, and Warrior's River, on the same side, is accessible to boats; the land is almost entirely covered with wood; it may be sixty miles long,

and of irregular breadth, not exceeding twenty miles. It is separated from Ysabel Island by Manning Strait. This island is 120 miles long, and about twenty-five broad; it is mountainous, but its shores are for the most part low, and covered with mangroves. St. George's Island, thirteen miles long, to the west of the southern extremity, Black Cape, covers the bay named by Ortega "Des Milles Vaisseaux," within which is the small but very secure harbour, Astrolabe; and to the north-west is Mount Gaillard, 2050 feet high.

To the east the chain is double, Georgia, Guadalcanar, and San Christoval islands, lying on the south, and Gower, Carteret, the Arsacides, and other small islands to the north. These are similar in character to those already described, but San Christoval may be noted as presenting two harbours, Port Philip on the south-west, and Leoné Bay, which is landlocked, capacious, and affording wood and water. Rennell's Island lies about eighty miles south-west of San Christoval. The Louisiade archipelago consists of a range of islands and reefs extending above 400 miles to the south-east of New Guinea; the easternmost, Adelo Island, is a mere rock; but the next, Rossel Island, is large: of this it may be said that it is formed of lofty mountains, the sides of which are covered with thick forests, and the shores deeply indented, and faced with coral reefs and numerous islets. St. Arguan Island, twenty-seven miles long, is remarkable for the abruptness of its shores. D'Entrecasteaux islands and Trobriand islands lie to the west.

Between the south-west coast of New Guinea and Australia is the Arafura Sea, the entrance of which, between Melville Island and Timor Laut, is 180 miles wide, and about the same between Cape Valche and Wessel's islands on the east; it is of circular form, and about 450 miles in diameter. Near the centre are the Arrow or Aroo islands, or Pulo Arau, so named from the casuarina which is abundant there; they are little known, though forming a group 100 miles long by fifty broad; they are of limestone formation, and very low. Mr. Wallace has lately visited them.

4 *Australia*.—The island of Australia, when first discovered, was, as has been already noted, supposed to form part of the great Terra Australis, the illusive existence of which was dispelled by the voyages of Cook; the discovery of different portions of the coast has also been recorded. Of the interior, scarcely even Africa, to the northern and southern portions of which it bears much resemblance, has proved more difficult of access, and after many years of toil the central portion still remains unexplored; Sturt having, in 1845, scarcely reached the twenty-fifth parallel, and not crossed the 138th meridian, leaving more than 1200 miles of unknown country to the west, and more than 400 to the north; while Mitchell, in 1846, though having explored the country parallel to the east coast, did not extend his journey into the interior more than 150 miles; and the recent exploration of Gregory from the north-west up the Victoria River has not reached further south than the twentieth parallel.

With the exception, therefore, of the south-east angle forming the basin of the Murray River, it may be said that only a strip of country round the coast has been examined. We are not, however, ignorant of the character of the interior: Sturt's journey terminated in an arid desert to the north-west; Gregory's, in country of the same character to the south-west; in such a country to the north, Leichardt perished; and it may now be safely asserted, as the geological structure of the country has indicated, that the desert tract in the centre extends over more than two-thirds of the entire area of the island, which consists of a basin of schistose rocks enclosing a vast tertiary deposit, on the outer flanks of which rest, to the north, secondary, and to the east, rocks of the primary and transition series, through which numerous eruptive and volcanic rocks make their appearance. The tertiary deposits of the centre reach to the southern coast, and also the centre of the western coast; about Swan River the primary series again appears. From the character of the winds blowing on the coast from the interior, these being



at one season dry and hot, and at the opposite waterbearing winds, it has been assumed, and with some appearance of probability, that the centre of this desert region is at one period a shallow lake, but much further observation will be necessary before this can be satisfactorily determined.

The country intermediate between the east coast and the basins of the Darling and Lachlan was first explored by settlers in search of pasture lands, and subsequently by searchers for gold. The valleys and plains of the north-east were also opened in the search for pasture, and it was supposed that others to the south of the Gulf of Carpentaria extended far inland, and presented a country desirable for settlement; but the recent visit of Lieutenant Chimmoo (1856) has proved the proximity of the north extremity of the great desert to the shores of the gulf. On the west the hills approach the coast so closely that no available land can be expected in that quarter, save what is known on the Swan River to the south and the Albert to the north. The promontorial extension to the east of the Gulf of Carpentaria remains indeed to be explored, but it may without hesitation be said, that the Australia of commerce and history is the eastern and south-eastern portion of the island.

This great island, intermediate in size, though not in character, between other islands and the continents, lies between the 10th and 40th parallels of south latitude, and between the 112th and 154th meridians of east longitude, and is therefore above 1800 miles in extreme length from east to west, and nearly 1600 from north to south in extreme breadth. These estimates, however, give, when compared with most other portions of the earth's surface, but an inaccurate idea of the size of this island; the coast line being very short in comparison with the area, which exceeds 2,500,000 geographical square miles, the coast line being estimated at 7600. Great Britain, with an area of about 70,000, has a coast line exceeding 2500 miles in length, and estimating, which is below the mark, twenty-five miles of area to one mile of coast in Great Britain, Australia will have 350 to the same length of coast line. The description of such an island must needs be concise, notwithstanding its vast size.

*Coasts.*—The most marked feature of the north coast, if not of the rest of the whole island, is the great Gulf of Carpentaria, exceeding 400 miles in depth from north to south, and 300 in breadth from east to west, while the entrance between Capes York and Arnhem is about 330 miles across. From Cape York to the bottom of the Gulf the coast trends nearly north and south, and is but little indented, though to the south are some large inlets, of which Bynoe and Van Diemen may be mentioned; the coast here is low, sandy, and destitute of vegetation. To the south, the Gulf receives the waters of Flinders and Albert rivers; the former of little importance, although it gives indications of being at some seasons a torrent, and opens into lake-like reaches; its banks are well wooded. The second is of some consequence in a country so destitute of water as is Australia, yet it is not navigable for vessels of any size, having only eleven feet on the bar at high water. An extensive mud flat covers the mouth, which is nearly straight for three miles. It has apparently two branches, but that to the south is a mere creek; the true river has its course from the west, is 250 yards wide and from two to five fathoms deep; its banks are fringed with mangroves, and it has several islands; about six miles from the sea it is about a quarter of a mile wide, and here the banks are covered with gum trees and acacias; here also the river winds much, and there are several islands; above, it opens into lake-like expanses; the country gradually rises, and the scenery becomes picturesque; palm trees, and bamboos fifty feet high, diversify the outline of the wooded banks, beyond which stretch vast plains covered with coarse grass, and dotted at long intervals with clumps of small trees; these are the Plains of Promise of Stokes, though apparently scarce worthy the name; the soil is light, and in some places rich, but in others stony. The Albert rises in two sources, and is navigable for boats two miles above their confluence. The entrance of the river is marked by a high clump of mangroves, with which indeed all the

southern shore of the Gulf is fringed, and behind this fringe, over which the land is not seen, are extensive mud flats, which at low water are uncovered one mile from the shore, the water shoaling very gradually. The temperature at the bottom of the Gulf ranges about 90°, but falls to 62° at night and morning: it is remarkable that here, as in some places to the north and west of Australia, only one tide is felt in twenty-four hours, while in others there are four.

The west and south-west coast of the Gulf of Carpentaria is more indented, and has many islands off it; the Wellesley Group, of which Mornington Island is the largest, lies at the south of the Gulf; they are wooded; the shores are principally coral and sandstone, and where low covered with mangroves. Sir E. Pellew's Islands lie 130 miles to the north and west; and about eight miles to the north of these is the Groote Eylandt of Tasman, which may be about twenty-five miles across. On the coast are some considerable bays.

To the west of Cape Arnheim is Melville Bay, and to the west, again, Arnheim Bay; an extensive sheet of water, covered by Wessel Islands on the west, and English Company's Islands on the east; and there are other bays to the west, the most important of which is Port Essington, remarkable no less for its size than its security; it consists of two basins, the inner of which is five miles in diameter, though its available surface is narrowed by a sand-bank; the outer harbour is one mile in width thirteen miles from the mouth. This harbour is situated to the north of Coburg Peninsula, attached to the main by a narrow isthmus, and forming Mount Morris and Van Diemen's bays to the north and south; the prevailing rock here is red sandstone, but Bedwell and Rose mountains are of trap and rise 400 feet; the country and soil are poor, but on the east well wooded; the climate, though not absolutely pernicious, is unsuited to European constitutions.

Van Diemen's Gulf is about eighty miles in extent, and covered by Melville and Bathurst islands, which are separated by the narrow channel of Apsley Strait. Melville Island presents low points and sandy bays, with patches of mangrove to the north; but on the south are cliffs sixty feet high, of red sandstone and ironstone, with white marl or pipe-clay; one round hill rises 320 feet. Clarence Strait, fifteen miles wide, separates these islands from the main; and the Vernon Islands, surrounded by a coral reef, lie in the entrance of the strait. About Cape Hotham, the south-east limit of Van Diemen's Gulf, the country is of red sand and iron stone, and very poor; the sandstone cliffs on the coast are fronted by a coral reef. To the south of Cape Hotham is Adelaide River, having a course of eighty miles from the confluence of its two sources; its banks are fringed with mangroves for fifteen miles, but above that, are, like the Albert, well wooded; but beyond them the country is one wearisome level, dotted with islands of timber; wherever the water is fresh there the thickets are interspersed with bamboos. This river falls into Adam's Bay, six miles deep and ten broad, by many creeks, and has many anastomosing branches; the main channel at the mouth has more than three fathoms water. Beyond this the country is a thirsty level, the coast for the most part fringed with mangroves, but occasionally broken by cliffs of fine grained sandstone, interspersed with clays and calcareous matter. Talc has also been found imbedded in quartz rock. Ports Darwin and Patterson must here be mentioned; the former extends for thirty miles, and is remarkable for its cliffs of slate, granite boulders, and singular detached hills; the latter is twelve miles long and seven wide, and within it Bynoe Harbour, having an entrance two miles and a half wide, winds round to the south-east for nine miles, with five fathoms water.

Point Pearce is a level cliffy projection, at the entrance of Queen's Channel, which is twenty-eight miles wide, and marked by Clump and Quorn islands. This channel receives the waters of Fitzmaurice and Victoria rivers, and has an extensive mud-flat between it and the former, which is scarcely more than a creek; beyond which Macadam range rises 700 feet

above the sea; it extends inland thirty miles, with a breadth of half a mile; the latter has a breadth of two miles, and flows through a sterile country of red sandstone near the mouth, but which improves thirty miles higher up, where it flows between rocky banks. The water is not fresh for seventy miles from the sea; being navigable for vessels of burden for about the same distance, and for boats 125 miles, this must be considered a river of much importance in a country so ill watered as Australia. At the mouth of the river, between Pearce and Turtle points, the coast is bold, but presenting extensive mud-flats at low water, over which the tide, which rises twenty-four feet, comes in with a bore; these are fringed with mangroves, as are the banks of the river for thirty-five miles on the right bank, the left being bold: here the character changes, presenting a defile about two miles wide between rocky ranges of compact sandstone, 500 feet high; and thirty-miles above, a similar defile is found. The sea range is, however, the highest, culminating at about 800 feet; and between these a rich, well-timbered alluvial plain extends seventeen miles in width, through which two affluents, the one from the south, and the other from the north, named respectively Norton Shaw and Saunders, flow to the main stream. The parallel ranges of hills which stretch north-east and south-west, and bound the valleys, are flat-topped, presenting cliffs thirty to forty feet high, and culminating at less than 700 feet above the sea; the plains consist of light soil on compact clay. The thermometer ranges higher here than at the Albert, the ground never cooling, and the country being less healthy.

From the north of Sea range, Ellesmere range stretches north-east, forming extensive table-lands 900 feet above the sea, and on the opposite side of the river, Murchison range, of similar character, extends to the south-west. Stokes and Fitzroy ranges form the eastern limit of Green Valley, and beyond them the river has hollowed a channel for its waters one mile in width, and 500 feet in depth; here shale and débris lie at the base of sandstone cliffs, rising 300 feet above them; these, like the other ranges, extend in table-lands. Wickham River flows into the Victoria from the south-west, in latitude  $16^{\circ} 30'$ , through a plain crossed by sandstone ridges; and between this and the main stream, as well as about the latter, which has its rise in two sources from the south, the trap formation affords a good grazing country, extending for many miles, but crossed by sandstone valleys. There is a small affluent between Wickham River and the main stream, and the confluence of the two sources is in latitude  $17^{\circ}$ , longitude  $131^{\circ} 20'$ .

The south-west source of the Victoria is in latitude  $18^{\circ} 20'$ , longitude  $130^{\circ} 50'$ ; and beyond this, Mr. Gregory has penetrated eleven miles to the south: he found the source in a level grassy plain of red sandstone; and beyond, a vast plain, extending to the south, without water or vegetation, formed of loose red sand. From the source of Wickham River, he found the ridge dividing the waters in latitude  $17^{\circ} 42'$ , and crossing this, in longitude  $129^{\circ} 58'$ , in latitude  $17^{\circ} 55'$ , a creek, the waters of which flowed south and west for thirty miles; thence, west for thirty miles more, its channel was dry; in longitude  $120^{\circ}$ , latitude  $18^{\circ} 25'$ , he found brackish water flowing to the south: on the north-west of this plain, named by him Denison's, and to the south-east, sandstone ranges 150 feet high; but beyond, a sandy desert extended on both sides, and the creek terminated in the dry bed of a salt-lake, about ten miles across, having indications of inundation 20 feet above it, and surrounded by low ridges of drift sand, and an acacia forest to the north: the centre of the depression was in latitude  $20^{\circ} 16'$  south, longitude  $127^{\circ} 35'$  east, and 900 feet above the sea.

Fifty miles to the west of Queen's Channel is another deep inlet stretching into a hilly country, called Cambridge Gulf, beyond which the coast trends west and north for eighty more to Cape Londonderry, from whence it again takes a south and west direction, and presents a very broken outline, covered with islands for 150 miles to Prince Regent's Inlet, which receives the waters of the small river Glenelg. The intermediate country

presents schistose and slate rocks with siliceous sandstone, and its surface is rugged and broken; and near Glenelg River enormous granite boulders are found, though about the river there is some good land.

On this coast are high rocks of the transition series, and table-topped sandstone hills rising 900 feet above the sea, are continuous at the same elevation to Fitzroy River, but the prospect is cheerless, notwithstanding Stokes remarked that the fragrance of the gum trees was perceptible at sea. Hanover Bay, Brecknock Harbour, and Collier Bay may be noted; the second is six miles deep, and nearly two wide, at the entrance, the width increasing to five at the head; the latter, twenty miles wide at the mouth, narrows to six, and its shores are fringed with scattered mangroves. To the south, a sterile region of white siliceous sandstone lies between Collier Bay and King's Sound; the coast is covered by a string of small islands, on which slate and granite appear; and here Port George the Fourth offers extensive and excellent harbourage. Within King Sound, the only safe anchorage on the east side is in Port Osborne; it is covered by an island and nearly surrounded by rugged sandstone ridges, the gorges between which are densely wooded; it is one mile deep, and three-quarters of a mile wide, with deep water. Coral banks cover the islands off this coast. Cape Leveque, the western extremity of King's Sound, is a red sandstone point, sixty feet high; here red is the prevailing colour of the country, which is sandy and barren. This coast, as well as off Yampee Point, to the east of the sound, is remarkable for the irregularity of the sea-bottom, and consequent irregularity and strength of the currents. Roe's Archipelago also presents fantastic outlines of primitive rock. Within the gulf, cliffs of white concretionary sandstone are found, and portions of the country are covered with delightful verdure, but mangroves fringe the coast, which rises gradually to an elevation of 200 feet.

The sandstone cliffs terminate at Foul Point, beyond which, about Fitzroy River, the coast, as at the mouths of the other rivers already noticed, is low and muddy, Cape Torment at the entrance, consisting of banks of mud and sand, bound together with long grass, being three miles wide, flooded at high water, and deeply intersected by narrow creeks. The bar has only two feet depth at low water, but six miles up the river the depth is fourteen feet, and the stream 400 hundred yards wide; Stokes found here evidence of inundations in which the rise of water had been twenty feet. This river also rises from two sources, the largest of which is the southern; it is navigable for boats ninety miles from the coast in direct distance to the south and west; twenty-two miles beyond this, the country presents one wearisome level, open to the west, but more wooded towards the east. This river, like those of Northern Australia, opens in lake-like reaches; the banks are often twenty feet high; in its middle course cliffs of fine-grained red sandstone are found, about which the country is heavily timbered: on the east bank, near the mouth, quartzose sandstone prevails, and the country is almost destitute of animal and vegetable life. The thermometer here ranges about 100°.

The peninsula which forms King's Sound has been named Dampier's Land, from the navigator of that name, who discovered it in 1688; its coast is straight and rocky, marked at Cape Emerian by tall white cliffs, with ledges of dark rock at its base; the country rises gradually in undulating well-wooded heights, the coast still fringed with mangroves to the south. Cape Baskerville, 200 feet high, forms the limit of Beagle Bay, which is three miles wide and seven deep; and here the country is low and open, marked by great ant-hills and palm-trees. Roebuck Bay, marked by Cape Villaret, a cliff of red sandstone 150 feet high, in latitude 18° 18' south, is sixteen miles across; its north-east shores formed of red cliffs twenty to thirty feet high, above which are extensive plains, with scattered clumps of trees, which appear to be flooded at some seasons; to the south the coast is low, formed of mud-banks fringed with mangroves. The climate here was remarked by Stokes to have a peculiarly depressing effect, which he thought not due solely to the heat, although the thermometer

rose to 118°. From hence a low coast trends to the south and west 300 miles, to Cape Lambert, where the coast is dreary and sterile, rising occasionally in red sandstone cliffs and stony-topped hills, 200 feet high, and indented with muddy mangrove creeks. Off this coast lies Dampier's archipelago, the small islands composing which are formed of greenstone, and present a dreary and desolate appearance. This chain extends above 170 miles to North-west Cape, the limit of Exmouth Gulf; they are connected with the main by extensive reefs, which have, however, deep water over them. They appear to be the ruins of a vast promontory, the sea bottom presenting terraces; on which, at forty miles from land, there is a depth of 110 fathoms, and the same distance from the islands fronting it about 200 fathoms. Burrow Island is the largest, being twenty miles long and twelve broad; some of these, as Tremouille Island, are high, approaching 150 feet; most are protected by coral reefs. Deputch Island, the centre of the Forresters' group, lying beyond Cape Lambert, and which may be considered as the north-east extremity of the archipelago, is of columnar greenstone, and a corresponding hill of the same formation is conspicuous on the main opposite to it; it is eight miles in circumference, and 514 feet high. Turtle Islands are low banks of sand and coral.

Exmouth Gulf is formed by a narrow rocky peninsula, extending north from Cape Coates to North-west Cape; fifty miles from thence a level country extends 100 miles to Cape Cuvier, the northern extremity of Shark Bay; it would appear probable that the whole of the coast is frequently inundated, the inundations extending to Shark Bay, and isolating the rocky peninsula west of Exmouth Gulf. Cape Cuvier is distant 120 miles from Steep Point, the southern extremity. This extensive bay, or gulf, is divided into two harbours, named respectively Hamelin and Freycinet, by Peron peninsula, which is about sixty miles long and twenty broad, and connected with the main by a narrow isthmus. The former and more northern is about thirty miles wide at the mouth, and has Faure Island in the centre; the latter, about ten miles wide at the mouth, expands towards the bottom. Dirk Hartog, Dore, Bernier, and Koko islands, stretch nearly across the entrance of the gulf from Steep Point; Geographe Channel, the broadest entrance, is to the north of the latter, and Naturaliste Channel, to the north of the former, which is about thirty miles long and five broad; the others being much smaller. The three small groups forming Houtman's Abrolhos are 120 miles to the south of Steep Point; of these Wallabi Islands are the most northern; these are separated from Easter Islands by a channel six miles wide; and these, again, from Pilsart group by a channel four miles wide. They extend in a north-west direction for forty-eight miles, and stand on a rocky platform, having thirty fathoms of water, but sinking precipitously to the west into 250. Easter group is remarkable for its excellent harbour, named Good Friday Harbour, and for its rocks of cream-coloured limestone on Rat Island; some of these islands are coral lagunes. Between the Abrolhos and the main is Geelvink Channel, named after Vlaming's ship. Moresby's flat-topped range marks this coast; the similarity of which to the sea range on Victoria River, Cape Flattery on the north-east coast, and the cliffs at the head of the great Australian bight on the south, have been noticed by Stokes. Wizard Peak culminates 715 feet above the sea; it is a solitary pyramidal hill, formed of blocks of ironstone, as is great part of the range to the north. Mount Fairfax, at the south extremity of the range, is 585 feet high. Here the country is all arid and barren, and the coast hills, which extend to the Darling range on the south, culminate in Mounts William and Seaward, respectively 1720 and 1270 feet above the sea. This coast has no secure harbours, nor any rivers worth notice.

The most important river on the west coast is Swan River. Its principal source is the Avon, a string of water holes, which, after receiving the Dale, Toodyoy, Howick, Ellenborough, Helena, and Canning, after a course of about 200 miles, falls into the extensive estuary of Melville water, a lake-like expanse surrounded by park-like meadows, studded with clumps of trees.

This river, like others in Australia, is subject to terrible inundations ; but the soil deposited is deep and rich, and bears continuous cropping for many years. The country about the Swan River consists principally of dull green-looking downs, backed by hills 2000 feet high ; three miles from the coast calcareous concretionary ridges extend parallel to it ; beyond which are sandy forest land and low hills, which rise 2000 feet in the Darling range, consisting of red cellular sandstone, and detached granitic hills having an appearance indicating the action of fire, with undulating woody country at base ; and in the interior the Talbanop culminate 5000 feet above the sea. Basalt is found at Geographe Bay on the south, and from thence coal formations extend to Shark Bay on the north, nearly 600 miles. The geology of the Swan River is marked by the absence of secondary and transition rocks ; tertiary of the newest kind resting on primary rocks from Darling to Sea range ; this latter containing shells of existing species traceable north to Shark's Bay, and the same formation, with clays and gypsum, found in Abrolhos. Slate is found on Canning River. Melville Water opens in Gages Road, an insecure anchorage covered by Rotte-nest Island, from which a shoal extends one mile and a half to the north. The tide here rises thirty-one inches, while farther north it exceeds twenty and often approaches thirty feet ; but along the whole west and north coasts there is only one tide in twenty-four hours.

Cape Leuwin (Lioness), the south-west point of Australia, appears like an island ; it is steep and rocky, and the coast to the east picturesque and well wooded ; between this and D'Entrecasteaux Point the coast is low and sandy. Eclipse Islands lie off Peak Head ; they are low and barren, the largest only one mile and a half long ; beyond these is King George's Sound, offering by far the greatest advantages of any port in West Australia ; within it are two excellent harbours, Princess Royal for large, and Oyster for small vessels ; the former has an entrance only a quarter of a mile wide, but with deep water, and is marked by Mount Clarence on the east, rising 520 feet. Breaksea and Michaelmas islands cover the entrance of the sound ; these islands are small, but elevated, with a deep water channel between them.

Eastward the coast becomes sandy and barren ; Cape Shoal, formed of white sandhills, with other similar points, breaking the coast line ; here is Recherché archipelago, extending for 135 miles, and consisting of small islands and reefs. Esperance Bay, fifteen miles wide and twelve deep, is full of rocky islets, and beyond this Cape Le Grand projects five miles into the sea ; and further east Cape Arid, from behind which a bank of sand, from 400 to 600 feet in height, extends eastward and forms the coast line at the head of the Great Australian bight, projecting in cliffs at Culver and Dover points. This bight may be estimated as 600 miles from point to point, and 200 miles deep ; its shores, which in the centre are low and covered with dense scrub, are unbroken by rivers, but towards the east Fowler Bay presents good anchorage, as do also Denial, Petrel, and Coffin bays, the latter marked by Mount Greenly, rising 800 feet and clothed with wood. These bays are covered by the islands of Nuyt's archipelago, the most considerable of which are the isles of St. Peter, off Denial Bay ; they are, like the coast, low and sandy ; the largest is six miles long and about four broad ; the south-westernmost group are the isle of St. Francis, formed by a sandy isthmus uniting two rocky hills ; it is three miles long, and affords good anchorage in a bay on the north-east.

Whidbey Point forms the extremity of the peninsula at the western side of Spencer Gulf, having Coffin Bay on one side and Port Lincoln on the other, and extends for about fifty miles, forming two open bays and rising in an elevated ridge to the east, from which Cape Catastrophe projects its round summit covered with trees. Port Lincoln is an excellent harbour, with deep waters, and well sheltered ; the entrance is five miles and a half wide, but divided by Barton Island, four miles in length. Thistle Island, twelve miles in length, lies off Cape Catastrophe, from which it is separated by Thorny Passage, about five miles in width, and from thence Spencer Gulf extends to

the north and east 160 miles, with an extreme breadth of seventy-five; it is about thirty miles wide at the mouth, from Thorny Island to Cape Spencer. The surface of this gulf is unbroken, except by the Sir Joseph Banks' Islands, about thirteen in number, the largest about five miles long; and as well as the shores for the most part low and sandy; there are convenient anchorages, especially at ports Germain, Yatala, and Augusta. Hardwicke Bay, formed by the west trending of York Peninsula, on the east of the gulf, is twenty-seven miles in breadth and eighteen in depth. The Gambier islets lie in the centre of the passage between Thistle Island and Cape Spencer. This gulf has originally received the waters of Lake Torrens, which extends in a horseshoe-like bend for above 400 miles round the hills at the head of the gulf, with a breadth of about twenty-five miles. This very peculiar feature in the geography of Australia may be considered as forming the centre of a great saliferous district, extending from the Murray to the Swan River; it is approached from the east through rugged passes, over the débris of shivered quartzose rocks, which extend north-east and south-west in parallel ranges not exceeding 1600 feet in elevation; on the flanks of these lie plains of sandstone and clay, and lower ridges marked by long narrow belts of pine trees; to the north, the rocky flat-topped ranges formed of compact quartzose rise 2000 feet above the sea, and there is an extensive pine forest to the east of Mount Lyell, while some park-like prairies are found to the west, and towards the north, occasional grassy woodlands separated by sandy ridges: on the whole, however, the country is hopelessly barren, and destitute of water. Near the tropic, the extent of our knowledge in this direction, Sturt found the same undulating plains of red sandstone which Gregory found forming the watershed of the Victoria. The banks of Lake Torrens form a gentle slope studded with bushes; deep soft clay and gypsum form the bottom, on which is a coating of salt; it does not receive the waters of any considerable stream, and has no surplus to discharge. The country here is of the best character, except about the head of the gulf, and the harbours most excellent; it is 300 feet above the sea, and its southern extremity about fifty miles from the bend of the gulf; a branch has also been traced to the northward, into which it is not improbable that the Victoria River, rising near the source of the Maranoa, once fell.

York Peninsula, about eighty miles long, separates Spencer and St. Vincent's Gulfs; Kangaroo Island, about eighty miles long and thirty broad, high, well wooded, and fertile, lies twenty-three miles from Cape Spencer, forming Investigator Strait. It has an excellent harbour at Kingscote, on the north side; St. Vincent Gulf is about forty miles wide at the mouth, and 100 deep, and receives Wakefield, Torrens, and Oukaparinga rivers; the former has good anchorage in its mouth, but the country round is poor and destitute of timber: at the head of the gulf the Torrens forms the harbour of Adelaide, giving shelter to vessels of considerable size, but having its entrance obstructed by a bar. To the east of Cape Jervis is Encounter Bay, eighteen miles broad and seven miles deep, communicating by the dangerous Goolwa Channel with Lake Alexandrina, or Victoria, which receives the waters of the rivers Murray, Bremer, Angus, and Finnis; this lake is thirty miles long and about the same in breadth, and connected with Lake Albert by a strait five miles long; it contains several islands. The country round is level; the entrance is narrow and shallow and obscured by sandhills, which extend along its entire length.

The Murray River, formed by the confluence of the Murray and Darling, is by far the most important in Australia; in direct line from the mouth to the source of the Darling it extends 750 miles, and its basin is 500 miles both in length and breadth. The affluents of the Darling are principally in its upper course; of these, the Kindeer, Keraula, Nammoy, Gwyder, Macquarie, and Castlereagh may be named; but the most important is the Condamine, from the north, which has its affluents, the Cogoon and Maranoa, in close proximity to the waters falling into the sea by the north-east coast. The Darling is the

secondary source of the Murray, and rises in the grassy range of Darling Downs, 2000 feet above the sea, within fifty miles of the eastern coast. Its head waters are beautiful clear rapid mountain streams, which not unfrequently flood the level country, about its middle and lower course, 300 miles from its sources; here, however, the river more frequently consists of strings of pools, which, in its affluents, are not always connected; it is of little breadth, and frequently the current imperceptible, having a tortuous course through plains of ferruginous sandstone, having verdure only in the narrow slip in breadth not exceeding two miles, and sometimes not a quarter of a mile, which is affected by the inundations, the country beyond being sandy, desolate, and scrubby. The plains of the lower Darling are only 250 feet above the sea. This river does not receive any affluents from the north-west, and its junction with the Murray is under the 34th parallel of north latitude, and in longitude 142° east. The Bogan, its last affluent from the south-east, has its waters saline, and flows through a barren country.

The Murray has its rise in the Australian Alps, at probably double the elevation of the sources of the Darling; it has several affluents from the south, rising close to the south coast: its northern affluent, the Lachlan, is formed by the confluence of the Lachlan and the Murrumbidgee, which also have several affluents, and have their upper courses in the western slope of the main watershed of Australia, and in their valleys are the principal localities where gold has been discovered. These streams are like the sources of the Darling, but the stream of the Murray is perennial, and not subject to sudden floods, but rising gradually about one inch daily from July to December, when it is usually seventeen feet above its lowest level, but after its junction with the Darling, and for some distance above, it partakes of the character of other Australian rivers. Lake Bonney is a shallow basin, annually filled by the waters of the Murray, and connected with it by Hawkins' Creek, a winding channel six miles long; the lake is only ten miles in circumference, its shores wooded towards the river, but formed of low arid sandhills; on the other side there is also a branch of the Darling, up which the water flows northward into it; and the country about the mouth of that river is marked by water meadows, creeks, and lagunes. Lake Victoria, which though shallow and often nearly dry, has a basin twenty-four miles in circumference, and is surrounded by park-like country, beyond which, however, is an arid salt desert. The lower course of the Murray may be said to commence under the 34th parallel; here are sandy ridges covered with pine trees, the banks of the river rising to a flat tableland about 300 feet above the sea level, the bed of the river, at 200 miles from the coast, not exceeding 100 feet in elevation.

Lines of granitic formation occur near Lake Victoria, and volcanic influences are apparent in the deep crater-like lake at Mount Gambier. There is a dense mass of scrub about ninety miles above the mouth of the Murray, and a very extensive and singular fossil deposit, which appears again near Lake Victoria, a range of metalliferous hills intervening. This river is navigable for two-thirds of its course, but although with depth and capacity for large vessels in its lower course, it is inaccessible to them from a bar at the mouth.

The ranges of mountains in which these rivers have their sources extend for more than 1000 miles along the eastern coast of Australia with much continuity, and proceeding to the north and north-west in extensive table-lands of considerable elevation; and have their southern extension from Port Philip, to the west in Mount Alexander, the Pyrenees, and the Grampians. The rocks here are principally trappean, and about Mount Alexander much gold has been found; between the Murray and St. Vincent Gulf are slate quarries, and the richest copper deposit in Australia.

Beyond Encounter Bay, Guichen Bay affords safe anchorage, and from hence to nearly Cape Bridgewater, a bold headland, the coast is low and sandy, but marked by Mounts Gambier and Schanck, of volcanic formation, and the latter having the remains of an extinct crater; here Glenelg River falls into



the sea, and beyond, Portland Bay, thirty-two miles wide and nine deep, affords excellent anchorage; to the S. E. is Percy Island. At the mouth of Bass Strait, the northern shore of which, extending from Cape Otway to Wilson Promontory, 150 miles, forms a deep bight, is Port Philip, sixty miles from the former, and twenty-four miles farther to the east is Port Western; Port Philip extends thirty miles from north to south, and eighteen from east to west, having depth of water for large vessels, while its entrance, only two miles wide, is contracted by reefs. The principal anchorage in this extensive area is Hobson Bay to the north, sheltered by Gellibrand Point, which receives the Yarra-Yarra River, about fifty yards broad at the mouth, but inaccessible to large vessels, and having a rapid and broken course. The country round is famed for its park-like appearance; here sandstone rocks and tertiary deposits prevail; the hills in the immediate neighbourhood rise 1300 feet. Geelong and Corio Harbours, far superior to Hobson Bay, are formed on the western side of Port Philip.

Port Western is separated from Port Philip by the narrow promontory terminating in Cape Schanck; it is of irregular form, its entrance covered by Grant Island, and French Island, surrounded by a narrow muddy channel, occupying its upper part. Grant Island terminates to the east in Cape Wollamai, remarkable for its wedge-like shape and red colour. This bay offers the most accessible and secure harbourage; the country round it is remarkable for the luxuriance of its vegetation; the rocks are of the carboniferous series.

From the entrance of Bass Strait, at Wilson Peninsula, the coast of Australia trends in a concave sweep for more than 180 miles to Cape Howe; the land here is low, sandy, and partly covered with small trees, behind which, about fifty miles distant, elevated mountain-ranges are seen. Cape Howe is the south-east point of Australia, and is marked by a rounded hill of the same name, which rises 1250 feet. Twenty-five miles beyond is Red Point, the southern entrance to Twofold Bay (so named from containing two bays within it), to which the coast is for the most part bold and rocky. This bay affords in Snug Cove the only harbour on this part of the coast. Its shores consist of steep headlands, rocky points, and sandy beaches; at the back of which, ponds and lagoons are mostly found. It is marked by the double heads of Mount Dromedary, which rises 2700 feet, and the corresponding hummock of Mount Finlay, 2910 feet above the sea.

From Twofold Bay the coast is indented with small creeks; here Montague Island is found three miles from the coast, it is about two miles long and 210 feet high. Bateman Bay receives the Clyde and McLeay rivers; both are inaccessible from bars at their mouths. This part of the coast is marked by a conical hill, called by Cook the Pigeon-house, and to this point its character does not change, the interior being mountainous and well wooded, but from hence it becomes low and thickly wooded, with sandy beaches, rocky ledges, and islets as far as Cape St. George, seventy-five miles from Port Jackson; beyond this point is Jervis Bay, seven miles long and four broad, its entrance between Perpendicular Point, which rises 275 feet from the sea, and Bowen Island, about one mile and a half wide; the anchorages are in Montagu Road, on the east side of the bay, and Darling Road, to the south. Bowen Island, separated from the south point of the bay by a narrow chasm, is high, with rocky coasts, partially wooded and fertile throughout the coast of the Illawarra district, the garden of New South Wales.

A few miles north of Perpendicular Point is the north extremity of the peninsula, that forms the east side of Jervis Bay, with the bight behind called "Crookhaven." Thence to Black Point is fourteen miles, passing the outlets of the Shoalhaven Rivers. Red Point is about six leagues north of Black Point. Next come Wollongong and Cape Solander, forming the south point of the entrance to Botany Bay, as Cape Banks does the northern. Port Jackson is a safe and excellent harbour between Botany Bay, about four leagues to the south, and Broken Bay five leagues to the north of it. Fifteen

leagues from Broken Bay is Newcastle Harbour, and eight leagues from thence Stephens Point and Port Stephens, nearly seventy-nine from Port Jackson.

From Bass to Torres Strait, the coast is bounded by a ridge of mountains, which in some places approach to within a few miles of the coast, leaving only a comparatively narrow strip of land. The coast line itself presents often bold perpendicular cliffs of sandstone, in horizontal strata. These cliffs are occasionally interrupted by low sandy beaches, some of which stretch to a considerable distance inland, and appear to have been covered at no very remote period by the sea. The indentations on this coast are more remarkable on account of their number and the excellent harbours which they form, than for the extent of surface which they occupy. From its supposed resemblance to our own South Wales, Cook named this part "New South Wales." Proceeding southwards from Cape York, we find Shelburne Temple, Princess Charlotte, Bathurst, Trinity, Rockingham, Halifax, Repulse, Shoalwater, Hervey, and Wide Bays—the last, in lat. 25°. Thence continuing southwards and entering the settlements still comprised under New South Wales, are found Glasshouse, Moreton, Broken, Botany, Jervis, Twofold Bays and Corner Inlet. From the north are Capes York, Grenville, Weymouth, Sidmouth, Melville, Flattery, Bedford, Tribulation, Grafton, Cooper, Sandwich, Cleveland, Bowling Green, Upstart, Gloucester, Palmerston, Townsend, Clinton, Manifold, Capricorn, Sandy, Moreton, Lookout, Danger, Byron, Lennox, Smoky, Plomer, Hawke, Elizabeth, Sugar-loaf, Blackhead, St. George, Dromedary, Green, Howe, Ramhead, Point Hinks, and Wilson Promontory. Hervey Bay to the north cedes in importance to Moreton Bay, which is formed between the mainland and the islands of Moreton and Stradbroke. This district has been called by some, Cooksland. For several degrees south, no great indentations are found until we arrive at Port Stephens, when a succession of noble harbours occur, destined evidently to form great emporia of commerce.

*Barrier Reefs.*—Along the east coast lie the "Barrier Reefs," forming a vast submarine buttress, skirting the shore. The great Barrier Reef extends from Break-sea Spit, in 24° 30' latitude, and 153° 20' longitude, to Bristow Island, near New Guinea, in 9° 15' latitude, and 143° 20' longitude, a distance in a straight line of about 1100 geographical miles—being the longest known coral reef in the world. This reef affords two passages for ships sailing from Sydney, *vid* Torres Strait, for India, Singapore, and China; *firstly*, the *Inner* passage, between the mainland and the Great Barrier; and *secondly*, the *Outer* passage between the Great Barrier and the numerous other reefs extending towards New Caledonia.

*Islands.*—Australia, like other continents, has islands of some magnitude attached to it—the largest is Tasmania. The other principal ones are Flinder and King Islands in Bass Strait; Kangaroo Island at the mouth of the Gulf of St. Vincent; Dirk Hartog Island, forming the west side of Shark Bay; Bathurst and Melville Islands, off the north coast of Arnhem Land; Grooto and Wellesley Islands, in the Gulf of Carpentaria; Great Sandy Island, on the east coast. Besides these—Prince of Wales' Group off Cape York; the Pellew and others in the Gulf of Carpentaria, Wessel and English Company Islands near Melville Bay; Buccaneer Archipelago to the south-west of Cape Londonderry; Dampier Archipelago; Barrow and others off De Witt Land; Bernier and Dorre Islands off Shark Bay; Recherche Archipelago on the south coast near King George Sound; Nuyt Archipelago; Stradbroke and Moreton Islands, are found between Wilson Promontory to Moreton Bay and the Solitary Isles north of Port Macquarie. Howe and Ball Pyramid Isles lie about 400 miles east of Port Macquarie. To the north, along the east coast, commence the coral islets, including Bunker, Keppel, Northumberland, Cumberland, Percy, Hill, and other minor islands.

*Rivers.*—Commencing from Cape York, a small stream, the Escape, flows into Newcastle Bay; and to the south of Cape Bedford, Endeavour River flows through a comparatively good country. We next reach the Brisbane, navi-

gable for seventy-five miles; and the Logan, both of which discharge themselves into Moreton Bay. The Clarence and Tweed flow into Shoal Bay; the Manning and the Hastings next follow. The Karua flows into Port Stephens; the Hunter into the port of the same name; the Hawkesbury, and its tributary the Nepean, into Broken Bay; the Shoalhaven into the Bay of that name; the Clyde into Bateman Bay. On the east of Gipps Land is seen the common estuary of the Thomson, Riley, and Arthur Streams; the Perry, Dunlop, and Barney unite also in one stream, and next the Machonochie and Latrobe unite their waters before falling into the ocean. The Yarra-Yarra empties itself into Port Philip, the Geelong also; the Hopkins, Shaw, and Fitzroy flow into Portland Bay; the Glenelg into Discovery Bay about longitude  $141^{\circ}$ . The Murray, the Darling, and Murrumbidgee have already been described. Among others may be mentioned the Dumaresque, Gwyder, Peel, Castlereagh, Macquarie, Culgoa, Bogan, Lachlan, and Bazungun. Farther north flow the Barwan, Condamine, Warrego, Barcu, Belyando, Burdekin, Suttor, &c., in the interior. The Torrens and the Gawler are only small streams flowing into the east side of the Gulf of St. Vincent. In *Western Australia* the Kalgan runs south into King George Sound, the Denmark into Wilson Inlet; next comes the Shannon, and then the Blackwood, emptying itself near Port Augusta into Hardy Inlet. Proceeding northwards, the Preston and Collie Rivers flow into Leschenhault Estuary, the Murray into Peel Inlet; the Canning into Melville Water, and the Swan River, already mentioned, into the same. The Moore, Arrowsmith, Hull, and Murchison, flow by short courses into the sea. Between the Gascoyne and King Sound few, if any, streams are laid down on our best maps. The Fitzroy flows into King Sound, and the northern Glenelg was discovered in 1837 by Grey and Lushington. Stokes' Victoria and the Murray have already been mentioned.

*Lakes.*—Few large lakes are found in Australia, and then only under a state of temporary inundation. Of these lakes or swamps, the most remarkable is Lake Alexandrina, fed by the Murray; the next is the Dambeling, discovered in 1843 by MM. Lander and Lefroy in Western Australia. L. Torrens, to the north of Spencer Gulf, is said by Eyre to be 400 miles in length, with an average breadth of 15 to 20 miles; this lake in the dry season is, however, a mere salt marsh. The same will probably be the case with the newly discovered "L. Gairdner." This district has besides been explored by Sturt, Frome, Babbage, Freeling, Goyder, Hack, Warburton, Gregory, and others. Many smaller lakes present often only beds of dry rushes after long-continued drought. Pits of brine are frequently seen in the interior, which after heavy rains are so diluted as to become nearly, if not quite, fresh.

*Mountains.*—On the east coast the mountains continue from Cape York in a S.S.E. direction, with apparently several interruptions to Cape Wilson, intersecting the district of Moreton Bay or Cooksland, and thence New South Wales, in which it separates the waters flowing west into the interior from those flowing east to the coast. The Liverpool range is the most northern portion, and under the 32nd parallel inclines from the general direction towards a more west and east course. The highest summits, which are of greenstone, approximate to 5000 feet in height. Proceeding south, the range assumes the name of the "Blue Mountains," about forty miles west of Sydney, presenting some very striking scenery, with enormous chasms, ravines, and precipices. Farther south, from the 33rd parallel of latitude to Bass Straits, these mountains are called the Warragong, or Australian Alps. Approaching the Straits, they assume a still bolder appearance, and the syenitic peak of Mount Kosciusko is said by Clarke, the latest authority on the subject, to attain the height of 7308 feet, and several detached peaks are reported to reach the line of perpetual snow. Another range, commencing near the south coast at Portland Bay, in latitude  $36^{\circ} 52'$  S. and longitude  $142^{\circ} 25'$  E., after pursuing a northern course for some distance, connects itself with the Australian Alps. Still another smaller range occurs in South

Australia, running north from Cape Jervis to the singular horseshoe depression of Lake Torrens. On the west side of Australia, successive ranges run northwards nearly on the meridian of  $116^{\circ}$  E. from Point d'Entrecasteaux to Cape Preston, near the Dampier Archipelago. This range, called the Darling, averages from thirty to forty miles in breadth, but does not attain a higher elevation than about 2000 feet. Another range, to the east of the Darling range, has its southern termination near King George Sound, where, according to Mr. Gregory, along the coast near Mount Barren, it rises to a height of 3000 feet, with barren rugged summits.

*Climate*.—Two-thirds of Australia are within the temperate zone, the other third belongs to the torrid, and the localities occupied by Europeans are, generally speaking, healthy. The climate of New South Wales is particularly salubrious. The temperature of Sydney is rather above  $65^{\circ}$ . At Perth, on the west coast, it is rather below  $67^{\circ}$ , while at Melville Island, on the north, the winter average was in 1827-8 about  $80^{\circ}$ . The officers of the late expedition up Stokes' Victoria River report favourably of the climate. The summer months are December, January, and February; the autumnal, March, April, and May; June, July, and August form the winter; and September, October, and November the spring. Speaking generally, the climate of the districts south of the Tropic may be considered dry, and years of almost uninterrupted drought sometimes occur; but dews are also frequent, falling during the heats of summer like drizzling rain. Hailstorms occasionally occur, and frost and snow in the more elevated districts. The rapid transitions from heat to cold are remarkable. North of the Tropic the rains increase in density, and at Arnhem Land and Cape York the quantity is often very great.

*Vegetation*.—Generally speaking, the vegetation assumes a dark and sombre hue, and along the coast presents a dull and monotonous colour, tiring to the sight. More inland, however, amid the sameness of the forest, are often spots teeming with luxuriant vegetation, sometimes laid out in stately groves, free from thicket or underwood, at other times opening on glades and slopes intersected by rivulets and carpeted with the softest turf. The southern portion exhibits to a certain extent the vegetation of other temperate climes, while Northern Australia appears capable of yielding the usual products of tropical countries. The plants, however, seem more novel than useful. In New South Wales many of the woods take their names from the predominating trees, such as Iron-Bark Forest, Stringy-Bark Forest, &c. The eucalyptæ or gum-trees are numerous, also acacia, casuarina, banksia, &c. The orange, lemon, fig, banana, guava, pine-apple, yam, peach, vine, olive, mulberry, &c., are found in abundance. Tobacco and maize are also grown, and the wild oat and rice have been found by Stokes and Gregory. The native flowers, often exceedingly beautiful, are, with few exceptions, inodorous. In the more favoured parts of the country, pasturages of the best quality are numerous, and admirably adapted for the rearing of vast herds of cattle and flocks of sheep.

*History*.—Although the Spaniards, Quiros and Torres, saw the north coast of Australia as early as 1606, the Dutch were the first who became acquainted with any considerable extent of the coast. In 1618, Dirk Hartog arrived at the island of the same name on the west coast. In 1618, Zeachen ran along the north coast; Edel Land was, in 1619, discovered by the navigator of that name; Lewin Land followed in 1622. In 1623, Arnhem Land, on the north coast, was sighted by the *Pera* and the *Arnhem*; and in 1627, Pieter de Nuyt fixed the position of various points on the south coast. In 1628, De Witt and Carpenter were on the south-west and north coasts, and in 1629, Pelsart was cast away on Houtman Shoals in latitude  $29^{\circ}$ . Tasman coasted the north-west coast in 1644, and was followed, in 1697, by Vlaming, who made the land in latitude  $31^{\circ} 58' S.$  and longitude  $130^{\circ} 13' E.$ , and afterwards saw Swan River. In two expeditions in 1688 and 1689, Dampier visited and described the west and north-west coasts. In 1710, Rogers, with

Dampier, passed along the north coast ; and in 1721, Roggeween lost a ship on the east coast near Aurora Island. Bougainville, in 1768, visited the coasts, and was followed in 1772 by Marion du Fresne. From 1770 to 1774, Cook, in several voyages, surveyed the east coast, passed through Torres Strait, and proved the insularity of Australia from the north. In the years 1786-7, La Perouse navigated along the east coast, in 1788, Shortland ; and in 1791 Vancouver and Broughton explored 110 leagues of the south-west coast, and discovered King George Sound. In 1793, D'Entrecasteaux and Labillardière, with Beautemps-Beaupré, discovered Port d'Entrecasteaux and several other places. Bligh, in 1788, and Hayes, in 1794, visited various spots on the east coast. In 1797-8, Bass and Flinders proved the insularity of Australia from the south, and in 1804, the China fleet passed in safety through Bass Strait on its voyage to China. Flinders, in 1802, surveyed the south-west coast, and afterwards the north-east, passing through Torres Strait to the Gulf of Carpentaria, having circumnavigated Australia in eighteen months. From 1800 to 1802, Grant and Murray saw the south-east coast, and discovered Port Philip. Baudin explored the south-west coast in 1802 ; and between 1818 and 1822, King surveyed the unexplored coasts to the west of the Gulf of Carpentaria, delineated the coast line between Cape Hillsborough and Cape York, and also Melville and Bathurst Islands. From 1837 to 1843, the surveys of Wickham and Stokes included the east coast, also the Gulf of Carpentaria, Torres Strait, the north-west coast, Dampier Archipelago, the Abrolhos, Swan River, Bass Strait, and South Australia.

Among the later marine surveyors may be named Blackwood, Stanley, Yule, Bremmer, Chambers, Heywood, Hobson, Denham, &c.

*Inland Discovery.*—New South Wales includes the whole eastern side of the Continent from Wide Bay, in south latitude  $26^{\circ}$ , to Cape Howe, the south-east extremity, a distance of 1000 miles ; thence along the coast about 500 miles to the 141st meridian, which separates it from the Colony of South Australia. It is divided at present into three districts : 1st, New South Wales, the capital of which is Sydney ; 2nd, Moreton Bay, the chief town of which is Brisbane ; and 3rd, Port Philip, or Victoria, with Melbourne as its capital. The capital of South Australia is Adelaide.

From the commencement of the settlement at Port Jackson, strenuous endeavours were made to penetrate beyond the Blue Mountains, long considered an impregnable barrier between the colonists and the interior. The efforts of Bass, Caley, Barallier and others, were ineffectual, until the year 1813, when, urged by a fearful drought, Blaxland, Lawson, and Wentworth succeeded in penetrating about twenty-five miles to the west of the Nepean River, whence from the rugged brow of a precipice these enterprising adventurers were gladdened by the view of a well-watered district extending towards the west. Evans was next dispatched, and the Downs of Bathurst, with the Rivers Lachlan and Macquarie, were shortly made known. During the following year, a road was made by the convicts, extending 148 miles W.N.W. of Sydney, in places over precipitous ridges several thousand feet above the level of the ocean. In 1817, Oxley and Cunningham, failing to trace the Lachlan, penetrated beyond the 144th meridian, E., a distance of 400 miles inland. The next year, Oxley, disappointed in following the Macquarie, proceeded from Mount Harris easterly, in latitude S.  $31^{\circ} 15'$ , and discovered Liverpool Plains. Reaching finally Port Macquarie, he proceeded along the shore to Port Jackson. In these journeys, Oxley had penetrated 500 miles to the west of the Blue Mountains. In 1819, the Murrumbidgee River, and in 1823, the Brisbane Downs, were discovered. In 1824, Hovell and Hume, passing S.W., discovered the Hume, Ovens, and Goulburn Rivers, and were the first to perform the overland journey from Sydney to Port Philip. Logan, in 1826, discovered the Logan and other rivers. Cunningham, in 1827, discovered the Darling Downs, Peel, and Canning Plains ; and in 1828, a practicable route from Darling Downs to Moreton Bay. Sturt and Hume, in 1828, succeeded in ex-

ploring the dried-up surface of the Macquarie marshes, and ascertained that about thirty miles below Mount Harris the Macquarie River ceased to flow; its floods communicating, however, after heavy rains, with the Castlereagh. Sturt also traced the Darling River some distance. In 1829-30, Sturt followed the course of the Murrumbidgee to its junction with the Murray. Passing down this noble river, he saw the mouths of the Darling and of the Lindesay; and after a voyage of thirty-two days, entered Lake Alexandrina or Victoria. In 1831, Mitchell, in latitude  $29^{\circ}$  S., found *fresh water* in the Darling; and in 1835-36, traced the Lachlan into the Murrumbidgee, and the Darling into the Murray. He also explored much of the fine country now called Port Philip or Victoria, which he named Australia Felix. Strzelecki, in 1840, with Riley and Macarthur, discovered and named Gipps Land, into which M'Millan had before penetrated; Tyers surveyed the country between Port Philip and the Glenelg, and Dixon that at Moreton Bay. In 1839, Eyre, having discovered Lake Torrens and Mount Eyre, proceeded again, in 1840, to the Lake. During his prolonged routes, he explored Flinders Range, named Mount Serle and Mount Hopeless, and crossed the country to Baxter Range and Port Lincoln to Streaky Bay. Thence proceeding west along the south coast, he reached King George Sound, having proved the astonishing fact, that along a coast-line of more than 800 miles not a single river enters the ocean. In 1842, Frome explored the country east of Flinders Range, to the west of Lake Torrens; and in 1844, Grey and Burr journeyed along the coast from Adelaide to Mount Schanck. During the years 1844, 1845, and 1846, Sturt, with Poole and Browne, on his expedition to the interior from Adelaide, passed the Barrier Range, and ultimately succeeded in reaching the east portion of Lake Torrens. Imprisoned from January to July, 1845, at Frome Creek, on the west side of Grey Range, in S. latitude  $29^{\circ} 40'$ , and E. longitude  $141^{\circ} 30'$ , he examined the country around in various directions. Released, at length, by the brief rains, he succeeded in escaping to the N.W. in August, and proved, by a gallant dash into the interior as far as latitude  $24^{\circ} 30'$ , and longitude  $138^{\circ}$ , that the country to the north of Lake Torrens was for a great distance nothing but an endless stony desert. In 1844, Leichhardt, with Gilbert, left Moreton Bay, and after a perilous journey of 1800 miles, during which 3000 miles were traversed, reached Port Essington in North Australia, having discovered and named the Belyando, Burdekin, Lynd, Mitchell, Albert, Roper, Alligator, and other rivers. Early in 1846, Mitchell started from Sydney, reached the junction of the Macquarie with the Darling, crossed the Darling, and reached the Narran Swamp. In longitude  $148^{\circ}$ , and latitude  $28^{\circ} 31'$ , the Balonne was found to separate, to the south, into various channels. Its main and most westerly branch, the Culgoa, joined the Darling thirty miles above Fort Bourke. The expedition ascended the Balonne and the Cogoon, and discovered the Maranoa, Nogoa, and struck the Belyando in longitude  $147^{\circ}$ , latitude  $24^{\circ}$ ; and afterwards followed, during ten days, as far as latitude  $24^{\circ}$ , longitude  $144^{\circ} 34'$ , the Barcu, which river Kennedy, in 1847, afterwards traced to latitude  $26^{\circ} 15'$  S., and longitude  $142^{\circ} 20'$ , where it lost itself in the sands. On this journey Kennedy discovered the Thompson and the Warrego Rivers. Kennedy next, in 1848, explored the peninsula from Rockingham Bay to Cape York, where he was speared by the natives. Leichhardt, in 1848, started from Moreton Bay on his hopeless endeavour to cross the Continent to Swan River.

*West Australia.*—The name Swan River was given to a portion of the country by Vlaming in 1697. In 1801, the "Naturaliste" visited this coast; and in 1829, Fremantle took possession of the territory. Prior to this, however, Lockyer had, from Sydney, taken possession of the country at King George Sound. Bannister, in 1831, proceeded from Fremantle to King George Sound. Grey and Lushington, in 1837, explored a portion of the Glenelg River, and the country between that and the Prince Regent River in N. W. Australia. Landing, in 1839, at Shark Bay, Grey next discovered the Gascoigne and the

Murchison Rivers, and returned by a harassing overland journey along the coast, southwards to the settlements of West Australia. In 1848, Gregory and Fitzgerald surveyed the country from Perth towards the Gascoigne; and in 1849, Roe extended his surveys from Perth to the south-east, as far as the Russell Range. Austin, in 1854, explored the interior from Perth, west, as far as the 119th meridian, and north, to latitude  $27^{\circ} 50'$ . F. Gregory, in 1858, proceeding northwards from Perth along the coast, crossed the Murchison River, along the north bank of which he ascended, passed over to the Gascoigne, and descended to Shark Bay. He next proceeded along the north bank of the latter river, discovered the Lyons River, and explored a fine country, naming a peak, in latitude  $24^{\circ} 24' S.$ , and longitude  $117^{\circ} 25' E.$ , 3400 feet in height, Mount Augustus.

In 1855-56, A. Gregory, with his brother, F. Gregory, Elsey, Baines, Wilson, Mueller, and party, was despatched from Moreton Bay with two vessels to explore the Victoria River, discovered by Stokes. After extending the survey of the Fitzmaurice River, Gregory explored the Victoria to its sources, in S. latitude  $18^{\circ} 12'$ , and E. longitude  $130^{\circ} 39'$ , and named the Norton-Shaw and Saunders Rivers. Proceeding onwards towards the interior, the party reached latitude  $20^{\circ} 20'$ , and longitude  $127^{\circ} 35'$ , at an elevation of only 900 feet above the level of the sea. The distance between the farthest point attained and the Great Bight was nearly 800 miles; to the Fitzroy River, 300 miles; to the settlements of Western Australia, 900 miles; and to Sturt's northernmost point, 700 miles. To this latter point, however, the party at Hooker Creek was 600 miles, and afterwards at the sources of the Nicholson, only 450 miles distant. After leaving the Victoria, Gregory reached the Albert River, at the southern extremity of the Gulf of Carpentaria; and taking a circuitous route into York Peninsula, continued his journey along the Burdekin to the Belyando, proving the identity of the latter with the Sutter of Leichhardt. The journey from the north-west coast into the east settlements was performed within five months.

Mr. Gregory was next despatched from Moreton Bay west in search of Leichhardt. Steering for the Barcu River, he found, in S. latitude  $24^{\circ}$ , and E. longitude  $146^{\circ} 6'$ , on the left bank of the river, the letter L cut through the bark of a large tree. Having searched at the junction with Alice Creek, he next traced the Thompson River to the Tropic, in vain. Following then along the Barcu, the party arrived at Cooper Creek, and eventually explored the dry channel of the Barcu into Lake Torrens, crossing which, they proceeded southwards, and finally reached Adelaide.

In South Australia, Hack and Harris started from Streaky Bay in 1851, reached Yarlbinda, proceeded east to Warrea, and thence again south-east to the shores of the great salt lake "Gairdner," whence they returned to Port Augusta. Swinden, Thompson, and Campbell found that there exists an isthmus between Lake Torrens and Spencer Gulf. Goyder found the waters of the northern portion of Lake Torrens to be fresh; and Oakden was repelled from his position on fresh-water lakes, west of Lake Torrens, afterwards changing into salt lagoons. To the north and west of Fowler and Denial Bays, Miller and Dutton have explored a grassy country. Frome explored the country north from Adelaide to Mount Serle; Freeling that from Port Augusta to Mount Hopeless; and Warburton along the southern shore of Lake Gairdner. Babbage has passed on from Port Augusta to the north-west, with the object of exploring the country between Lake Torrens and the newly-discovered Lake Gairdner.

*Tasmania and Islands.*—Bass Strait extends from King Island to Flinders Island, nearly 200 miles east and west. The extremities of the former being about fifty miles distant from Capes Otway and Grim, the opposite points respectively of Australia and Tasmania, while the northern point of the latter is about seventy-five miles from the Australian coast.

Flinders Island is the northern and largest of the Furneaux group, the southern of which, Clarke Island, eight miles long and five broad, is separated

from Cape Portland, the nearest point of Tasmania, by Banks' Strait, eleven and a half miles wide. Flinders Island is rugged and barren, thirty-six miles long by twenty-one broad, rising in Strzelecki peaks 2550 feet above the sea, with many small islands and rocks; it is separated from Barren Island, twenty-four miles long and eighteen wide, by Franklin Strait, four miles wide, but strewed with rocks and shoals; the island is marked by Mount Munro, 2300 feet in elevation, and is separated from Clark Island by Armstrong Channel, eight miles long, and in extreme breadth four miles.

These islands are extended to the north in others of similar granitic formation; the most important of which, the Kent group, consisting of two islets and some rocks, lie about half way between Flinders Island and the main, on which the same formation appears in Cape Liptrap and Wilson Promontory, which form isolated hills connected with the land by banks of sand; five miles and a half from the latter is Rodondo rock, a conical mass of granite, 1130 feet in elevation, on the east side; Waterloo Bay is to the east of the promontory, extending in a valley three miles long, on the north side of which Mount Wilson rises 2350 feet: here rugged but densely-wooded mountain ranges present themselves, 2000 feet in elevation, with trees of large size, and small valleys opening on the coast in quiet sandy beaches. The sides of Mount Wilson are strewed with enormous granite boulders. King Island is thirty-six miles long and fifteen broad, and its northern extremity rises 595 feet above the sea; it is, like those already mentioned to the east, a continuous ridge of granite; it has three bays, which only offer partial security for shipping. The northern coast of Van Diemen Land, or Tasmania, forms the southern shore of Bass Strait, and extends for more than 150 miles, forming one great bight; to the north-east, it is singularly low, and is formed of sand-hills, from which rises the isolated peak William, 730 feet high, beyond which a rocky ridge culminates in Mount Cameron, 1730 feet above the sea.

The river Tamar is formed by the confluence of the North and South Esk. Thirty miles from the sea to Launceston, the river is navigable for small vessels, and large vessels may ascend to within a short distance, but the entrance is difficult on account of sand-banks and shoals. The tidal wave is felt for ten miles up the North Esk, but the South Esk falls into the Tamar by a cataract. The valley of this river is narrow, with steep sides, and densely wooded, formed by two ranges which strike off in a north-west direction from the central mountains of the island. From Cape Portland to the Tamar is fifty-eight miles, and within this distance, at eight, eighteen, twenty-nine, forty-eight, and fifty-three miles, the Currie, Piper, Forester, Tomahawk, and Ringaroma rivers fall into arid bays, increasing in width towards the east, the two last being named Anderson and Waterhouse, the latter being fifteen miles broad and seven deep, with boggy land at the head, and round wooded hills separated by narrow valleys. Mounts Barrow and Arthur, only nine miles apart, are 4300 feet in height; this is a district of primitive rocks, but Stony Head is basaltic.

To the west of the Tamar the character of the coast is similar; the Sorel, Mersey, Don, Forth, and Leven rivers, with the exception of the first, fall into the sea by a low sandy coast; hills 2000 feet high rise between the Sorel, which falls into Port Sorel and the Tamar, eleven miles apart, the others being respectively eighteen, twenty, twenty-three, and twenty-seven miles beyond. The mountains culminate in Valentine Peak, a mass of bare granite, 4000 feet above the sea; here Blyth River falls into Emu Bay, and thirteen miles beyond Inglis River is an inconsiderable stream. Circular Head presents a flat-topped mass of trapean rock, 490 feet high. Cape Grim is a steep black headland, from whence a low sandy beach and reefs extend to Hunter group, which consists of three principal and many smaller islands; these rise 250 feet, and culminate in three hummock islands 790 feet above the sea, are steep, rocky, and barren to the north, but more fertile and wooded to the south.

The prevailing winds in Bass Strait are south-westerly, those from the opposite quarter being only experienced from December to March, the cur-



rent then generated being dominated over by the tide, is not felt until to the east of the Furneaux group. This strait is navigable to the west when Torres Strait is not, a fact remarkable in the physical geography of this region.

The west coast of Tasmania is rocky and sterile, the most westerly point of the island is a sandy projection, in E. longitude  $144^{\circ} 40'$ , called West Point, to the north of which is a wide open bight; to the south, sandy beaches broken by rocky points are found, a ridge of low barren hills rising two miles from the shore, and beyond this are others more lofty and well wooded. Cape Sorell is a rocky projection forming the south point of a wide bay, within which is Macquarie Harbour, the entrance of which is on the north-west, marked by two elevated peaks, Heemskerk and Zeehaan, and high ridges extend between it and the Derwent. The entrance to the harbour is shallow, but it widens out, occupying a space of nearly eighteen miles in length with two to four miles in width. The water gradually deepens, in a south-east direction, to twenty fathoms, whence it again decreases to four fathoms off the mouth of Gordon River, a distance of nearly eighteen miles from the entrance of the harbour; the country around is irregular in outline, but covered with magnificent timber. Birch River also falls into this harbour, and, with the Gordon, is supposed to have its source in a triangular lake about fifty miles in circumference, situate among the hills between it and the Derwent, which also derives some of its waters from the lake.

From Cape Sorell the coast continues rocky, with fronting reefs to the bare white peaks of De Witt, the elevation of which exceeds 1000 feet. Here is a most remarkable harbour, Port Davey, four miles wide at the entrance, and extending inland in two arms to the north and east; in the latter are two secure anchorages, Bramble Cove and Bathurst Harbour, which receive the waters of Spring River; the Stephen also falls into this port; above is an extensive plain, probably the basin of a former lake, surrounded by heavily timbered heights.

The south-west cape of Tasmania has a sharp rugged outline, and the lands in the vicinity are desolate and barren in appearance. The southern coast is of similar character, the projecting headlands being basaltic. The Mant-suyker Islands lie off the south-west cape, and there are many other islets and rocks off the southern coast, but about fifty miles east of south-west cape is the extensive bay into which the Derwent and its tributaries from the north, the Dee, Ouse, Shannon, Clyde, and Jordan, discharge their waters; on the west side is Bruny Island, of irregular form, twenty-five miles long, presenting basaltic formation, well wooded, and fertile; it is separated from Tasmania by D'Entrecasteaux Channel, ten miles in length, and from three-quarters of a mile to seven miles in width; its northern shore is deeply indented, and forms several harbours; Récherche Bay is three miles wide and two deep, to the south of which is South Port. Port D'Entrecasteaux is a most excellent harbour, embosomed in gently sloping wooded heights, with three and a half fathoms water and muddy bottom, on which ships may ground without danger; beyond Récherche Bay are Actæon Islands and Mussel Bay, six miles beyond which is Port Esperance, two miles and three-quarters deep, and one and a quarter wide; and four miles farther, Huon River, the entrance of which is two miles wide, and opens into several bays, of which Swan Port is perhaps the most commodious, having deep water close to the shore, which is steep, rising with gentle acclivity to a well wooded and very fertile country. Huon Island, marked by a perforated rock, lies at the entrance to the river. North-west Bay is two miles wide by five deep.

From Tasman Head, the south point of Bruny Island, to Cape Pillar, the opposite point to the north-east, is thirty-four miles; this is the entrance to Storm Bay, in the north-west corner of which is the estuary of the Derwent; to the north is North Bay, extending into Pitt-Water and Norfolk Bay, the latter of which is eight miles long and four broad, affording anchorage to the largest fleet, in smooth water and good ground, on the

east side of Storm Bay. Burnett Harbour is fit only for small vessels, but the coves in Port Arthur afford shelter to the largest. The entrance to the river Derwent, between Cape Delasorte and Cape Direction is two and a half miles wide, and this breadth is continued for five miles to the south point of Ralph Bay, which extends six miles in depth. The river is accessible for the largest vessels for eleven miles; and beyond this, at Risdon Cove, four miles higher up, it becomes contracted to less than half a mile. The headlands in Storm Bay are mostly basaltic, and round Port Arthur a chain of lofty mountains extends; about three miles from the shore, within the Derwent Valley, the ground rises gradually towards the hills in the interior. The east coast of Tasmania extends from Cape Pillar to Cape Portland for 156 miles; Cape Pillar is a succession of high basaltic columns; from hence the coast forms a succession of bays until to the north Fleurien Bay, fifteen miles wide and ten deep, affords good anchorage. It extends between Cape Bailly and Schouten Island, which is separated from Freycinet Peninsula by Geographe Strait; these are high toward the sea, but low and well-wooded at the land side.

The mountains appear to belong to the cordillera of Eastern Australia, the channel of Bass Strait merely interrupting the continuity above water between Capes Wilson and Portland. A range of lofty mountains runs through the island from north to south, the highest peaks of which are Quamby Bluff, overhanging Norfolk Plains, Mount Field, Mount Wellington near Hobarton, and the high Peaks near Port Davey. Other lofty points are the Western or Platform Bluffs, Table Mountain, the beautiful eminences of Ben Lomond, Ben Nevis, and St. Paul Dome; the Three-thumb Mountains near Prosser Bay, and the rocky heights on Maria Island, called the Bishop and Clerk. Along the west coast, a minor range extends at Mounts Heemskerk and Zeeham towards the Western Bluff, where it joins the north and south range.

*History.*—Discovered by Tasman in 1642, and named by him, after the Governor of the Dutch East Indies, "Van Dieman's Land;" its shores were visited by Cook and Furneaux in 1773, and again by Cook in 1777, without discovering its insularity, which was proved afterwards by Bass and Flinders in 1797. In 1803, a detachment under Bowen from Sydney landed on the north bank of the Derwent, with a view of founding a penal settlement at a spot called Rest Down, since termed Risdon. The next year Collins arrived from England, took formal possession of the island, and selected the present site of Hobarton as his head-quarters. Other settlements were made at the mouth of the Tamar, and afterwards, higher up the river, at Launceston. In 1813 the restrictions upon its communications with the mother country and other colonies having been raised, the tide of emigration from England began gradually to set in, and the colony extended itself in various directions. In 1817 the population amounted to only 2000, the majority of whom were convicts; while in 1824 it had increased to 12,000; in 1834, to 40,000; and in 1851, to 70,000, of whom the bond population was under 20,000.

In form, the island is somewhat triangular, covering an area of nearly twenty-four thousand square miles, or about fifteen millions of acres. Approached from the east, it presents a picturesque and beautiful appearance, including a succession of lofty mountains, covered to their summits with wood, the highest of which, from April to October, are capped with snow. Viewed from the west side, the island appears rugged and wild. The island consists of a succession of mountain ridges and valleys, the former rising often into grand and fantastic peaks: it is copiously irrigated by numerous streams issuing often from beautiful mountain lakes, among which may be mentioned Lake Clair, from which the Derwent receives a portion of its waters.

From its higher latitude and its insularity, the climate of Tasmania may be considered superior to that of Australia, and the atmosphere, though warm, is comparatively free from the withering aridity of the latter; hence

also the greater vigour of its vegetation and density of its forests. The mean annual heat at Hobarton is  $52^{\circ}$ : the mean of summer being  $63^{\circ}$ , and that of winter  $42^{\circ}$ . Frosts are sometimes severe in exposed situations, but snow rarely continues in the lower grounds during a whole day. The spring months are July, August, and September; summer, October, November, and December; autumn, January, February, and March; and winter, April, May, and June.

*Vegetation.*—The natural vegetation of Tasmania resembles that of Australia; the trees being evergreens, and the foliage generally of a dark and sombre hue. The trees often attain a vast height and size, with little variety, however, in their forms. The gigantic blue-gum is the prevailing; next in frequency are the acacias, black and silver mimosas, Huon pines, myrtles, and pencil-cedars. The dogwood, pinkwood, and muskwood are fine-grained trees. The timber is often of the best description, and dense forests, many miles in extent, are found in various parts of the island. The myrtle often forms thick forests, single trees of which attain thirty to forty feet in circumference. In the interior, a species of *ficoides*, producing an edible fruit, is found. The variety of shrubs is great, some of which, more particularly the fern and the native cherry, are very beautiful. The indigenous botany is, however, like that of Australia, scanty in articles fit for human sustenance. A species of *plantago*, from which a good salad is made, grows in the sandy districts; and a large species of truffle, weighing sometimes not less than fourteen pounds, forms a good substitute for bread, and has been used in soups and otherwise by Europeans. The apple, gooseberry and currant have been introduced and thrive well; likewise other European plants and flowers; the scarlet geranium grows luxuriantly, the sweetbriar adorns the hedges, and altogether the settled districts present more the aspect of England than any other of the Australian colonies.

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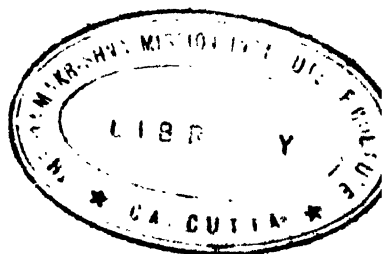
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